

AN
APPENDIX
TO A
COURSE
OF
Chymistry.

BEING
Additional REMARKS
To the former
OPERATIONS.
TOGETHER WITH
The Process of the *Volatile Salt of Tartar*,
and some other *Useful Preparations*.

Writ in FRENCH by Monsieur
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L O N D O N,
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THE P R E F A C E.

READER,

THE Course of Chymistry, to which this is an Appendix, was received so well, that I shall forbear using many reasons, why I now cause this to be Published. I am sure all such as have more in them of the Physician than Chymist, and whose designs are Truly and Methodically to Cure, by having laid a Solid Foundation for Physick by good Principles, and who do not expect as many Miracles from a Spirit, or Salt, as some Women boast of from a simple Receipt for the Ague, or the like; such Rational Physicians, I dare say, will gladly enough receive some hints of this Appendix. The Gentleman, though a Chymist to the purpose, and one that has spared no manner of pains to find out the Mysteries of this Art, yet is so extremely Candid, as to speak of Chymical Remedies, like a third person unconcerned, any further than real truth lies at stake. He makes few Panegyrics of the Remedies herein, or before mentioned, and discourses of them so, as to search out their nature by nothing but matter of fact, and rejecting all No-

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notions that his hand cannot touch, or his eye see. This present Supplement is the effect of his working Brain, since the first Edition of his Book, of which the Translation was made, the Author having since sent me two other Editions, out of which I have collected these Additions, for your further Curiosity. One thing particularly is here taken notice of, which I can never repent the reading, nor the being an instrument in making it better known; it is, that divers things do by Calcination and Distillation not only receive an impression of fire, but even fiery parts into their composition to a very great quantity, nay to a considerable augmentation of their weight and substance.

If you Calcine Lead in a Crucible, although you see a great many Vapours arise out of the matter during the Calcination, yet the Calx being at last weighed, will be found considerably heavier than the Lead was at first, which the wit of man can never explicate, but by admitting the reception of fiery parts into the Calx, see p. 33, 34.

Calcine four ounces of the common Regulus of Antimony, stirring it all the while with a Spatule, there will rise up a vapour for an hour and halfs time, or thereabouts, and when it fumes no longer, weigh it, and there will be two drachms and a half more than the Regulus weighed at first, see p. 60.

Distil in a Retort the Burning Spirit of Saturn out of Salt of Saturn, and let the Salt you distil be six ounces, you'll thence draw an ounce and six drachms of liquor, and there will remain in the Retort six ounces and six drachms of matter.

Now

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Now nothing in nature can here make this Addition of two ounces and a half, but the entrance of Fire, fire imbodied into the matter, see p. 35. of this Appendix.

The instances here mentioxed may suffice to prove, how that subtil, dangerous, and too active Principle, Fire, does predominate in abundance of Remedies, that are commonly used. I shall add one word concerning the manner of the Distillation of Acid Spirits, by which we may the better guess at their Nature and Capacity. A Retort is placed so in a Furnace, that the Fire may Reverberate, or beat back again upon the vessel, great fires are kindled, and continued for 2, 3, 4 dayes together, they are made as exceeding violent as Art can make them, the Retort and the Ingredients in it, if you look into the Furnace, do all appear of a live coal, they turn into as true a fire as the Wood it self, and there seems to be not the least difference but in the Figure, and thus by the violent force of this most active, vigorous, searching, but destructive Principle, Fire, the acid Spirits are driven out into a large Receiver, in White or Red clouds, and there having room to play a while, they at last condense into fiery Spirits, or a spirituous fire. These Spirits, when the vessels are cold, are taken out, and stoppt up carefully (hardly anything but glass stopples will serve the turn) and though they are fixt Spirits, the fire contained in them will needs tend upwards, and afterwards, as occasion serves, these nimble Spirits are not only used for Dissolution of Metals (which they do well for) but are given Christians

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Stians inwardly, too too often, nay, by some Chymical Practisers, especially such as love Chymistry so dearly, that they are in continual hopes of the Philosophers stone, these same Spirits shall be given with as much freedom, and as little regret of Conscience as a draught of Small beer.

Now does it not deserve serious consideration what these Spirits are made of, what is the nature of fire taken inwardly, and what miraculous effects must needs happen from these elaborate, and so powerful remedies! Nature is a tender thing, and must be used very gently if you would help her, she's a composition of flesh and blood, and uses wonderful moderation in every thing she does; offer her any thing injurious or distasteful, and she's never quiet till she has thrown it off; a draught of Milk and water will do her good to the very heart, when her functions are disturb'd, and she pants for burning heat. I know you may force her to be contented with Acid, cooling, (and yet fiery) Spirits given in Juleps, or the like, but whether they are really agreeable and beneficial to Nature, we may have no small reason to doubt.

I know the common universal practice of the world now-a-days will plead more for Acids than any thing I can say against them. Yet this is plain to my understanding, that all Big-worded Remedies, and such as are most popular, have their certain Fate, they have their beginning, their time of flourishing, and their Period. Once Spirit of Salt was all in all, every body must be dropping it into their drink. Now 'tis almost forgot; other Master pieces in Quackery have come in its place.

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Who would have thought lately, that Rabels drops (supposed to be Oyl of Vitriol sweetned) should so soon be no more talkt of? One would have thought at first, that this wonderful Monsieur would have spoiled utterly every Physicians practice, and that they would have had no more to do, he so Monopolized the whole Art by his Remedy. And yet we see he's return'd long since for France, and Physicians are just where they were before his coming.

I would not be understood, by what I have said, to condemn the use of Natural Acids, the Acid Ferment of the Stomach speaks their excellency sufficiently, and want of Appetite is immediately assisted by them; and besides all, Natural salts, of which Aliments are full, are known to be Acid, and there is no other salt in nature, but the Acid, as is at large proved in the following Treatise. So that Acids have their use, and benefit beyond question. But it is the frequent and continual use of Artificial Acids, such as are drawn by fire, and become of a fiery nature, that I presume to tax and question. A Citron in a Feaver may be of greater help and comfort, and allay the boiling Heat, and resist the prevailing malignity, more than can be thought. The Juyce of Lemmons, not that crude Juyce, which is commonly vended, and of which the Syrop is too too often made, but the Juyce of good Lemmons; and so of Oranges, might be put into Juleps to give them an Acidity, instead of Spirit of Vitriol, and no harm done. But a few drops, forsooth, of that suspected Spirit are more gentile, and neat, and, for the great honour of Chymistry, are grown into common use, almost as much as salt for our meat.

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Natural Remedies will prevail, when we have tried as many pretty conceits as we please. Nature will provide us Herbs and Roots, when Chymists, and Chymistry, as to great part of it, are dead and buried, and have undergone the same Fate that all particular Remedies of Hectors, and great Boasters have hitherto done, by the wise disposal of all-seeing Providence. They dye commonly with their Masters, or if they do out-live their thread of time, they soon decline more and more, till they come to lose all their Esteem.

Nevertheless upon urgent occasions, when Symptoms are exceeding violent, and are not to be conquer'd with ordinary means, Acid Spirits may, and perhaps ought to be used. As in a Pox or Gonorrhea, when Defluxions are violent, and Symptoms accidentally high, when the Patient is almost in despair, and frightened with unusual Symptoms, we must have recourse to Mercury, let us say what we will, and exhibit that quantity which otherwise we should not, if the person had been rightly treated at first; as we are forced to use Actual Cauteries, to prevent Gangrenes, and burn to the purpose, when there's a necessity for it: So in cases of the like nature, the disguised fire in Acids may be given inwardly, with safety enough. Pestilential Feavers, where the Blood is wholly fluid, and the Fibres that gave it consistence, and made it condense, when grown cold, are destroyed by the Subtile Malignity, may perhaps require better or stronger Acids than Vinegar can give.

Having

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Having spoken thus much in reference to Acid fiery Spirits, it may well be enquired, whether or no in the Distillation of such Spirits, there is any addition of weight, as there is most sensibly in the instances forenamed. To which I Answer, that Acid Spirits come forth with such Heat and Violence, that it is almost Impossible to lute the Junctures so exactly well, as not to lose some of them, they are so exceeding fiery, and of so piercing a nature, that some of them will break out, do what you can. How will a room smell of Nitrous Spirits, while they are a Distilling! they'l try what Lungs you are made of, let the Receiver be never so big or thick. And this is the reason, that the Ingredients weigh no more than when they were first put in; for as fast as the fire comes in through the Retort, some Spirits break out at the Junctures.

To prove the nature of these Spirits to be as Hot as I say, I could here instance an Experiment of this Author. 'Twas in short this: he Distilled Vitriol three dayes and three nights together, and there came forth an Acid Spirit, as it uses to do; when the vessels were cold, he found in the Receiver nothing but a Mass of salt, or Oyl of Vitriol congealed. This salt was so exceeding Caustick, that if he offered to touch the least part of it, it burnt like fire, and he was fain immediately to put his hand in water; and when he threw a little of it into the water, it made just such a hissing noise as burning coals do; it likewise made the water very hot, hotter than common Oyl of Vitriol will do. See p. 94, 95.

And

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And now I have done with Acids, it will be expedient to speak something of Alkali's. Knife and Sheath go together. Alkali salts, whether they be made by burning Plants into Ashes, or by Calcination in a Retort or Crucible, and so making of them a Lixivium, &c. they all lose the nature they were endowed with at first, and from Natural Acid Salts become Porous; the fire by opening them drives out the Acid part, and leaves them full of Pores, ready to receive, and make an Ebullition with any Acids they shall afterwards meet with; they are partly the remaining terrestrial, and fixt part of what they were, and partly an additional supplement of fire.

Now there are Natural Alkali's (though not Alkali salts) which perform the good effect of Alkali's, such as Perle, Coral, Crabs-eyes, &c. and these may be used to answer the Indication of sweetning Acids, without any need of having recourse to those productions of fire, so wit, Alkali salts, unless there be extraordinary occasion; as I said before concerning the use of Natural Acids, unless the greatness of Symptoms required the Artificial.

Speaking to this purpose to a most Ingenious Physician, he was pleased to ask me, whether I did not Roast, and Boil the meat that I eat, or whether that did terrifie me from eating my meat. But I think there's a great deal of difference between a warmer sort of Infusion, as Boiling is, and heat at a distance, which in a leasure tract of time dries, and prepares meat to be fit for the Stomach, which insinuates gently, and which
loses

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loses the destructive quality of fire, by reason of the distance, as is the manner of Roasting; there's a vast difference, I say, between these Heats, and turning Ingredients into a Coal fire, as is done both in Retorts and Crucibles in the making of Artificial acids and alkali's. And as for meat, I cannot much approve, and few Physicians, I think, do, that which is Broil'd on the Coals, and so nearly partakes of the Impression of fire; it digests ill, I am sure, and breeds Melancholick unwholsome nourishment.

Chymical Digestions are of most excellent use, to draw out the True and Natural virtue of things; they are made in a Sand-heat, or else in a Balneum, mild and tender wayes of opening bodies; and the Remedies lay no such force upon Nature, as upon the Disease. Remedies were at first ordered by Nature so well, as to need but little of our help, they were intended to help those poor harmless souls, who knew no better than to make an ordinary fire to keep themselves warm by, and these could gather a proper Herb to heat, or boil in a little water, and there often came rare feats of it too.

Volatile Spirits and Salts do rise with a gentler fire, and may for that good reason claim preference to all Fixt Alkali's, whether Spirits or Salts. Upon great occasions they will seem to work Miracles, raise Dead to Life, and when the mild flame of the Blood, (in which Life is said to consist) seems to be quite extinguished, these Volatile Spirits shall light it again a-fresh, and add new vigour to the languishing efforts of Nature.

But

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But these Volatiles too must be given with great caution, either the humours must be Prepared, or the Spirits very low, or else they may Translate the humours to the Brain, from the parts below, and give the Disease a Nobler Seat than it had before.

The Spirit of Sal Armoniack is an excellent thing, and though it is derived from Urinous, and seeming uncleanly Principles, yet if well drawn and rectified from Phlegm, has oftentimes great effects, and especially if Cohobated upon Castor and Amber, will yield to few Volatiles, unless that most Noble nay Royal Preparation of Goddard's drops, Prepared by that Ingenious and Learned Physician, Dr. Goodall; who upon enquiry into the nature of those Medicines, has been so free as to acquaint me, that they are separated with that moderate and gentle degree of fire, that the Balneum, in which the Glass bodies are placed, are never to exceed the heat of humane blood circulating in the vessels, or that of an Egg, upon Incubation: by which means there is a most exact, and even Natural separation of the Volatile and Spirituous parts, from the fixt and Phlegmatick. Whereas if this mild degree of heat were not observ'd, he saies the Principles would be confounded together. After this, the several Principles, with which this Noble Preparation is endowed, are by much labour, and proper degrees of heat, both in their repeated Sublimations, Rectifications, and Circulations, made all with a gentle fire, advanced to that degree of Volatility, that I have reason to esteem it one of the best
Ner-

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Nervous, Cephalick, and Hysterick Medicines, that is used in Chymistry, and much more effectual than others to answer all those Indications in our Art, where Volatiles, or Diaphoreticks are thought to be useful. Of this Preparation there are several sorts, differing secundum magis & minus, being Impregnated with one or more of the Original constituent Principles, in a higher or lower degree; so that they may be the better suited to variety of Constitutions, and answer very different Indications.

Perhaps some will say, I Prevaricate with my Design, in Prefacing such Cautions to a Book of Chymistry, and making great part of Chymistry a little too much suspected; and especially considering what I said in praise of this Art before the COURSE OF CHYMISTRY. But I would have it consider'd, that I never thought this sort of Remedies of much use in Feavers, and that Chronical distempers might possibly find some greater relief from those Active Medicines, especially after the tryal of others, by virtue of that *Maxime, à mitioribus ad fortiora progredendum*. These things may require some longer Discourse, and perhaps I may urge them further hereafter, when I may speak more at large concerning Remedies, and give some Practical Observations upon them. What I have now said, is not intended to discourage from using them upon very great occasions; only if plain things will do, what need we puzzle? where we can use safe, and innocent Remedies, such as are Natural, and in the way of Nature, easily Prepared, why should we
Neg-

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Neglect them, for sake of such as are, or may prove dangerous? For my part, I shall never so pin my Practice to the Authority of any one, no nor many Great Names, that I must forfeit the use of my own Reason, and Observation. What does good, I'll follow, though a silly Ignorant should teach me; what does bad, I'll avoid, though never so Magisterial.

THE



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I

A N
A P P E N D I X
T O
A COURSE of CHYMISTRY,

CONTAINING

The easiest manner of performing those Operations that are in use in Physick.

A D-D to Page 6. Line 26. In the Remarks upon the Principles of Chymistry. Nothing but the Oyl, can properly be said to be *Inflammable*, and the Oyl is so much the more so, as the Salts, with which it is closely united, have been more or less spiritualized. For that which I call *Spirit* in the Oyl, is nothing but an *Essential* or *Volatile Salt*; this *Salt* is not of it self *Inflammable*, but serves to Rarifie and Exalt the parts of the Oyl to render them the more susceptible of Motion, and consequently of *Flagration*; after the same manner as when *Salt-peter* is put to mix with some Oily substance, this Oily matter fires much more easily than when it is alone; though *Salt-peter* of it self is not at all *Inflammable*, as I shall prove hereafter. We have Examples of the truth of what I say in *Spirit of Wine*, *Oyl of Turpentine*,
A and

and all other Inflammable Liquors; for they are only Oyls subtilized and refined by the Volatile Salts they contain. Sticks, and other parts of Vegetables have a great deal of Salt much like to Salt-peter; this Salt being straitly united with their Oyl makes them the more apt to flame, than if it had not been a part. The Fat of Animals is full of a Volatile Acid salt; Wax, Rosine, and all other matters that are inflammable, are impregnated with an Acid Salt, *Essential* or *Volatile*.

I say the Salt which causes the flagration of Oyls, must be either *Volatile* or *Essential*, for if it were a *fixt* Salt, 'twould have a contrary effect, it would allay in some measure the quick motion of the parts of an Inflammable body; and this we see happens when *Sea salt* is flung into the fire, it serves to put it out. *Common Sulphur* yields us another instance of the same kind; consisting of one part Sulphurous or Oily, and another Saline or fixt Acid, which plainly appears in the opening of it, the Oily part fires, and would soon rise like other Oyls into a great White Flame, but that the Acid part being a load to its activity hinders it from rising, and so forces it to cast but only a small Blew Flame; and a proof of what I affirm may be had from mixing *Salt-peter* with *Sulphur*; for the *Volatile Salt* of *Salt-peter* does *Volatile* like the Salts of *Sulphur*, and causes a White flame to burn violently, as I shall shew hereafter in the Operation of *Salt Polychrest*.

Add to *Pag. 7. Lin. 22.* Is it not likely enough that the bottom of the *Sea*, or its shores, may be much like the surface of the Earth we inhabit, and that there may be Mountains, Rocks, different sorts of earth, and consequently *inexhaustible Mountains of Salt* in a Million of places at the bottom of the Sea, whence it receives its Brackishness?

And it may be there are Waters, which after taking Salt from several earths, do at last discharge themselves into the sea through an infinite number of subterranean channels, which do much contribute likewise to making Sea-water salt.

That which confirms me in this opinion is, because there are *Lakes* in *Italy, Germany, Egypt, the Indies*, and many other places, which are as *Salt* as the *Sea*, and can have no other cause but that their *waters* have hapned to run through *Mines of Salt*.

I doubt not but many will be apt to object against my Opinion, that the *Sea* being of so prodigious boundless an extent, all the *Salt* I have spoken of, would not be able to salt it as it is; but if they please to consider, that this great extent of the Ocean may meet with *Mines of Salt* in abundance of places, and what is once dissolved can never be separated from it, I am persuaded their doubt will soon vanish. Add to what is said, that *Sea-water* does not contain so great a quantity of *Salt* as is commonly imagined: and this is easily prov'd, if you take the pains to

evaporate some of it over the fire, or dissolve salt in that water; for it will receive a considerable quantity into it, which is a certain sign, that the water was not so salt before, as it might have been, for if it had been impregnated with as much as it could, 'twould have dissolved no more.

Therefore we have good reason to believe, that the *Sea*, which may be called a large *Lake*, becomes *Salt* through the *Mines* that are therein, and the *Salt Currents* that in several places empty into it.

Add to *Pag. 7. Lin. 30.* It may be objected that *Salt-peter* is found in places where no *Acid* liquor can be thought to come; but no body can doubt but that there is an *Acid* in the *Air*, which though a very insensible body, is able enough to enter into *Stones* and *Earths*, the truth whereof is seen every day in *Earths* that have lost their *Salt* as much as could be drawn by Art, which upon being exposed some time to the open air get new additions of *Salt*, and encrease their weight considerably. Now the liquor that I speak of, which runs in some places of the earth, receives its *Acidity* from this *Acid Spirit* of the *Air*, which condenses in some places better than in others, by reason of the coolness, or some other disposition it finds there.

I conceive therefore that *Salt-peter* is form'd in *Stones* and *Earths* by the *Acid Spirit* of the *Air*, after the same manner as *Sal Gemme* in *Mines* by an *Acid* liquor, and that this, *Aerial*

Acid

Acid entering insensibly into the body of *Stones* produces a *Salt* at first much like *Sal Gemme*; but afterwards new *Acid Spirits* still coming and mixing with it makes it of a middle nature between *Volatile* and *Fixt*. And it is for this reason that a great deal of *Salt-peter* is taken from old ruined buildings, for the *Stones* there continuing a long time exposed to the *Air*, receive greater quantity of *Spirits* than other *Stones*; it is likewise to be found in *Cellars* and other places where the *Sun* casts no heat, because the *Spirit* of the *Air* does there easily condense by reason of the coolness and moisture.

Add to *Pag. 8. line 3.* All *Earths* being impregnated with an *Acid Salt*; as I have said, 'tis not hard to conceive how that the *Salt* of *Vegetables* is communicated to them from the *earth* wherein they grew. Their *Growth* must needs have proceeded from a *Salt juice* of the *Earth* they grew in, which having opened the *Seed* through the *Fermentation* it caused, insinuates and filters it self into the *Fibers* that constitute the *Plant*; and the leaving grounds *Fallow* some years, is in order to preserve and retain the *Salt* that is continually encreased in them by the *Acid Spirit* of the *Air*. Likewise *Dung*, and other matters, which are said to fatten and fructifie *Lands*, do so by nothing else but their *Salt*. Neither need we wonder at the barrenness of *Sandy* and *Stony* soils, for that the *Acid* of the *Air* cannot unite and fix with them in sufficient quantity to render them fertile. Ne-

vertheless 'tis worth observation, that there are Lands which remain barren too through too great an abundance of *Salt* they contain, and for this reason in *Egypt* they are forced to temper their grounds with *Sand* after the Ebbing of the River *Nile*, to make them Fertile; because the *Earth*, 'till that is done, is so full of *Salt*, that its Pores are quite choaked up with it. So that instead of causing any *Fermentation* in the *Seed*, the *Salt* fixes and depresses it, that it can't have its motion free enough to rarifie, and raise a stalk; but now when *Sand* is mingled with it, it is able to divide and extend the *Salt*, which not having then such power of fixing the *Seed*, it Ferments and rises into a *Plant*. Whence it may be seen, that too much *Salt* is as Offensive to the *Earth's* fertility, as too little, and that it is the same thing with other Fermentable matters as it is with *Earths*, they come to ferment by means of a moderate quantity of *Salt* mixed with them, for if you add too much, the *Fermentation* will be spoil'd.

Again, every kind of *Salt* is not fit to fertilize lands, it must be a *Volatile Salt*, or approaching to the nature of *Salt-peter*, to serve for *Vegetation*; a *Salt* too fixt would rather spoil it, and it has been observ'd that places which should fructifie, have brought forth nothing, when *Sea-salt* has been sprinkled upon them; the reason of which is for that this *Fixt Salt* hinders the *Fermentation* that was necessary to produce fertility.

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Nevertheless it sometimes happens, that the *Ashes of Vegetables*, though full of a *fixt salt*, do serve to fertilize; and this Countrey men are well acquainted with, who in some places where they find their Lands too lean and barren to yield any thing without assistance of Art, do use at certain seasons of the year to burn *Fern* and *Turfs* upon them, and spread about the *Ashes*. Now it is by reason of a *Lixivious salt* in the *Ashes*, that the Lands are hereby improv'd.

But this happens for the same reason as I said before, for the *fixt salt* of *Vegetables* that lies in the *Ashes* is very *Porous*, as I shall prove hereafter; and so does very well mix with the *Spirits* or *Acid Salts* of the *Air*, and turns easily into *Salt-peter*, as when the *Spirit* of *Salt-peter* mixt with an *Alkali salt*, makes a good *Salt-peter*.

As for *sea-salt*, possibly it might happen, that if it were left in the Earth for some considerable time, 'twould impregnate with the *Spirit* of the *Air*, and so being at length *Volatilized* would render a place fertile. But because it is a very compact body, and its parts closely united, the *Volatilizing* of it would be a tedious business, and so the present requisite *Fermentation* failing, the place would remain barren too long to gratifie our expectations.

'Tis very likely that the *Volatile* or *Nitrons salt* meets in the Earth with some *Sulphurous* or fat matter, that is continually raised by the Subterranean heat toward the Surface of the Earth, and unites with it. This mixture of a *Volatile*

Salt and *Sulphur* together may much contribute towards explicating the manner of *Vegetation*; for just as the mixture of *Sulphur* and *Salt-peter* does excellently dispose to an *Exaltation* by heat, which will not happen while they are separated; so the Bituminous or fat part of the earth mixing with *Salt-peter*, which all Earths have, the subterranean heat exalts them much more easily, than if the *Salt* were alone. And now let us see what happens from this *Exaltation* to the production of *Plants*.

Some part of this *Sulphurous salt*, meeting with *seed* in the earth proper to grow, does enter into the *seed*, and cause a Fermentation, that is to say, *supplying* the parts of the *seed*, disposes it to open it self. Now 'tis very certain, and what has been sensibly demonstrated by *Microscopes*, that each *grain* of *seed* contains in little the *whole Plant* with all its parts. Wherefore this opening the body of the *seed* is by reason that the *sulphurous salts* entring at the pores of the *Root* of this *small Plant*, and by their Volatile quality insinuating all along the *Fibres* which constitute the *Plant*, do orderly display before us what was before but very confused in respect of us.

These *salts* do never enter at the head of the *Plant*, and so descend to the *Root*, though often the *Root* of the *Seed* lies uppermost, and the head or stalk downwards, because the *Pores* of the *Stalk* are not of such a Figure as is proper to receive them, whereas those of the *Root* have a proper contexture.

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The *Volatility* of these *Salts* does also cause the stalk, though seated downwards, to rise upwards, and follow their tendency, which is always up; and this is that which by extending and enlarging the Fibres of the Plant, makes it grow to that height which their nature requires.

'Tis probable that this fat part of earth insinuating with the *salt*, as I have said, does make the *Oyl* of a mixt body; for we find that those matters which help best to fertilize, are full of *Volatile salt* and *Oyl*, as *Dung*, *Urine*, and *Plants* corrupted.

'Tis fit to observe here, that the *salt* does act after another-guise manner than the *Oyl* in binding the Fermentation or corruption of the matter 'tis mixed with; for it does not only stop the pores, and hinder the air from entring, but fixes it likewise by its hooked parts, that it can neither have motion nor rarefaction, for which reason 'tis that *Meat* is *salted* in order to keep it *sweet*, and does thereby remain firm and compact for some time.

Three kinds of *salt* are drawn from *Vegetables*, an *Acid salt* called *Essential*, a *Volatile*, and a *Fixt salt*. The first is like *Salt-peter*, and sometimes like *Tartar*, according as it contains more or less earth; this *salt* is drawn from the *juice* of the *Plant*, as I said before; for after expression and purifying this *juice*, 'tis set in a vessel in some cool place a few daies without stirring, and the *salt* shoots into *Crystals* all about. This *Acid salt* may be said to be the true *salt* that was in the *Plant*, because the means that

that are used in drawing it are *Natural*, and such as cannot change its nature; but this can't be said of those others, because the violent fires that are used about them make impressions of another nature, and their effects are very different, so that the fire seems to alter and disguise them, as I shall shew in the following discourse.

The second salt, or the *Volatile salt* of *Plants* is usually drawn from seeds or fruits Fermenting. While it remains in the *Vegetable*, it differs from the *Essential salt* only in this, that being driven up higher by *Spirits*, it becomes more *Volatile*. The *Fermentation* that is caused in fruits by beating and bruising them, does very much assist in *Volatilizing* the salt; for it sets the particle at work, and disposes them for an easier separation; but it happens that in the great circulation, or continual motion this salt is in, it unites so strongly with the *Oyl* that Fruits and Seeds are full of, that they can't be separated by *Crystallizing* the juice, as they can in drawing them from other parts of the *Plant*. We must therefore have recourse to the help of fire. The *Fruit* or *seed* which contains the *Volatile salt*, as I shall prove in its proper place, is Distilled by a *Retort*, and *Water* comes forth in the first place, then an *Oyl*, and lastly a most keen ill scented *Salt* (that easily flies away) upon encreasing the fire to purpose, is driven into the *Receiver*. Now 'tis plain that fire has changed, or else added some thing to this salt; for when 'twas in the *Plant*, it had no manner of smell like that it gets by *distillation*. But to shew there's

a strange *Alteration* in this *salt*, as soon as 'tis mixed with an *Acid*, there presently appears an *Ebullition*, or *Effervescency*, which remains until the *Acid* has thoroughly entered into the *salt*. Which circumstance does not happen to it in its *Natural* being, 'tis this *Ebullition* that gave it the name of a *Volatile Alkali*, to distinguish it from a *Fixt Alkali*, of which I shall speak hereafter. The *Chymists* will needs have this *Volatile Alkali* to be in the *Plant*, just the same as when it is drawn; that is to say, they make this a different *species* of *salt*, lying hid under the *Acid*, until it is laid open by the force of fire. But this opinion is founded on no credible experience, for *Anatomize* the *Plant* how you think fit, without using fire, and you shall never find any other but an *Acid salt*. Doubtless 'twill be said, that all other ways of dissecting *Plants* even into their *salts*, prove too weak without the assistance of this *grand dissolvent* fire. But if we consider impartially how fire acts, we shall be forc'd to acknowledge that it rather destroys, and confounds the greatest part of the bodies it opens, and does not leave them in the *natural* state they were in before, and especially when 'tis driven with that force which is necessary to draw this *salt*. So that I see no reason why the *Species* of things should be *multiplied* without necessity, by admitting many kinds of *salts* in *Plants*, and I conceive with much more probability, that the *Volatile Alkali salt* is a part of the *Acid Essential salt* I spoke of, which having been first disposed to a *Volatile* nature, and afterwards driven by

by the force of fire, draws along with it a portion of *Empyreumatical Oyl*, that gives it such a disagreeable smell, and some terrestrious calcined matter, with which it is so strongly united, and which changes its nature, by breaking the *Saline* points, and rendring them *Porous*, so that any *Acid* liquor being cast upon it, enters into the *Pores* and violently divides the parts, whence follows the *Effervescency*. Perchance likewise this *Calx* or Calcined earth may have retained igneous particles, and so the edges of the *Acid* beginning to open the *Pores* of *Salt*, these little igneous bodies being in a violent motion do strike about, and break open all their small prisons, and from thence it may be, the violent *Ebullition* happens. Such as are prejudiced with the Sentiments of ancient *Chymists*, will relish very hardly this new Opinion of mine; but I am perswaded if any one will take the pains to examine the matter near at hand, and make some *Experiments* on the salts of *Plants*, he shall find my Discourse come near enough to truth.

The last salt or the fixt salt of *Plants* remains united with the earthy part after *Distillation* of the other substances; the matter is taken out of the *Retort*, and calcined in an open fire, for to free it from the soot that blackens it; afterwards the salt is drawn by a *Lixivium* as I have shewn before. This salt is called fixt, in comparison with others, because this can't *sublime*.

The *Chymists* do assure us, but with little foundation for it, that in Terrestrial bodies, in *Metalls*, *Corals*, *Pearls*, and generally in all bodies

bodies that Ferment with *Acids*, there is an hidden *Alkali* in them, which is one of the *Principles* of *Fermentation*, wherefore they give them the name of *Alkali's*; but because no manner of *Salt* can be drawn from them, to prove their Opinion, and they have no other rational Argument to perswade me, they must give me leave to think otherwise than they have done, and I conceive that the contrary to what they have established will serve me better to explicate the truth.

Following therefore the *Principle* I have laid, I believe that those Terrestrial bodies are themselves *Alkali's*, rather than that the *Ebullition* of *Acid* and *Alkali* proceeds from a *salt* supposed to be contained in them; and further that the *salts* are never *Alkali's* till they have undergone the force of fire, and been reduced into a *Calx*. I have proved, speaking of the nature of *Volatile salt*, that the fire did very much change the substances of things; and as I have shewn there is good reason to think there is but only one *species* of *salt* in *Plants*, and the *Volatile salt* is but a change wrought by fire, I shall proceed upon the same *Principle*, and affirm that there is no fixt *Alkali salt* in *Plants*, but that by *Calcination* the fire has fixt a part of the *Acid Essential salt* with the earthy part that has serv'd to break the keenest of its points, and rendred them *porous*, like a *Calx*. 'Tis by reason of these *Pores* that this kind of *salt* grows humid and melts so easily when exposed to the Air; and the Terrestrious parts do turn it into an *Alkali*, for if they

they were not mixed with it, 'twould continue still an *Acid salt*, and opposed to *Alkali*. But to clear up this point the better, we must consider as nicely as may be the nature of an *Acid* and an *Alkali*.

Whenas the nature of a thing so obscure as that of *salts*, can't better be explicated, than by admitting to its parts such figures as are answerable to the effects it produces; I shall affirm, that the *Acidity* of any liquor does consist in keen particles of *salts*, in motion; and I hope no body will offer to dispute whether an *Acid* has points or no, seeing every ones experience does demonstrate it, they need but taste an *Acid* to be satisfied of it, for it pricks the tongue like any thing keen and finely cut; but a demonstrative and convincing proof that an *Acid* does consist of pointed parts is, that not only all *Acid salts* do *CrySTALLize* into edges, but all Dissolutions of different things, caused by *acid* liquors, do assume this figure in their *CrySTALLization*; these *CrySTALLs* consist of points differing both in length and bigness one from another, and this diversity must be attributed to the keener or blunter edges of the different sorts of *Acids*; and so likewise this difference of the points in subtilty is the cause that one *acid* can penetrate and dissolve well one sort of mixt, that another can't rarifie at all: thus *Vinogar* dissolves *Lead*, which *aqua fortis* can't: *Aqua fortis* dissolves *Quick-silver*, which *Vinogar* will not touch; *Aqua Regalis* dissolves *Gold*, whereas *Aqua fortis* can't meddle with it; on the contrary *Aqua fortis*

fortis dissolves *Silver*, but can do nothing with *Gold*, and so the rest.

As for *Alkali's*, they are soon known by pouring an *Acid* upon them, for presently, or soon after, there rises a violent *Ebullition*, which remains until the *Acid* finds no more bodies to rarify. This effect may make us reasonably conjecture that an *Alkali* is a terrestrial and solid matter, whose pores are figured after such a manner that the *Acid* points entering into them do strike at and divide whatsoever opposes their motion, and according as the parts of which the *Alkali* is compounded, are more or less solid, the *Acids* finding more or less resistance, do cause a stronger or weaker *Ebullition*. So we see the *Effervescency* that happens in the dissolution of *Coral* is very much milder than that in the dissolution of *Silver*.

There are as many different *Alkali's*, as there are bodies that have different pores, and this is the reason why an *Acid* will Ferment one strongly, and another not at all, for there must be a due proportion between the *Acid* points, and the Pores of the *Alkali*.

The nature of *Alkali's* being thus established, there will be no need of flying to an imaginary salt in *Plants* for explication of the *Effervescency*; and 'twill be easily conceived that if an *Alkali* salt is full of a terrestrial matter that renders it porous like other *Alkali's*, it must cause an *Ebullition*. That which I said, speaking of *Volatile salts*, may here be added, that the *Igneous* particles breaking out through the Pores of the *Alkali*

Alkali salt, where they became imprisoned in the *Calcination*, do much contribute to the raising this *Efferescency*. And really when the *Acid Spirit of Vitriol*, or *Aqua fortis* is cast upon an *Alkali salt*, there happens as strong an *Ebullition*, as when this liquor is flung into the fire.

The *Fermentation* that happens to *Dow*, to *New Wine*, and such like things differs from that I now spoke of, in that it is more gentle, and slow; this is caused by the *Acid Natural salt* contained in them, which expanding and exalting it self by its motion, does rarifie and raise up the grosser and sulphurous part that endeavours to allay its motion, from whence it comes that the matter swells up.

The reason why an *Acid* does not make *Sulphurous* things Ferment, with so much noise and suddenness as *Alkali's*, is, because that *Oyls* consist of pliant parts that yield and make no resistance to the points of *Acids*, as a piece of *Wool* or *Cotton* will yield and give way to needles that are thrust into it. Thus methinks two sorts of *Fermentations* may be admitted of, the one of an *Acid* with an *Alkali*, which may be called *Ebullition*, and the other, when an *Acid* does by little and little rarifie some softish matter, as *Dow*, or clear and Sulphurous, as *Muske*, *Syder*, and all other juices of Plants. This last sort may rather be called *Fermentation*.

'Tis further remarkable that the *Acid* and *Alkali* do so destroy one another in their conflict, that when as much *Acid* has been by degrees

grees poured as is necessary to penetrate the *Alkali* in all its parts, it is then no more an *Alkali*, nor can it be so again, though you wash it to carry off the *Acid*, because it has no longer that disposition of *Pores* which is requisite in an *alkali*; and the *Acid* breaks and loses its points in the contest especially when the *alkali* is pretty compact and solid; so that if you would recover your *Acid* again, you'll find it has in a manner lost all its acidity, and retains only a sharpness. But the *Sulphur* or *Oyl* consisting of supple yielding parts does only receive some *Acid* impression, and no such close union, so that it can be drawn from Sulphureous bodies much the same as when it was mixt.

The *Salt* of *Animals* does differ but little from the *Volatile salt* of *Seeds* and *Fruits*, both which are drawn in a *Retort*; they have the same kind of smell, taste, and other virtues. The *Volatile salt* of *animals* keeps dry a longer time than the others, because it carries away with it more *fixt salt* than those others. As for *fixt salt*, *animals* do yield but a very little of it, and in some *animals* you shall find none at all; it is drawn as the *fixt salt* of *Plants*; they are both *alkali's*.

There is no *salt* that can be called *alkali*, to be found in the parts, or humors of *animals*, until they have passed the fire; a Saline serosity may be observed in them, but that *salt* is *acid*; and it proceeds doubtless from the *Aliments* that are taken for nourishment. Now as I have shewn that there is only an *acid salt* in *Earth*;

and *Vegetables*, so I may say the same of *Animals*, and the rather because no other kind of salt can be found in them in their *Natural* state, the *alkali salts* that are drawn from them, are only several mutations of an *Acid salt*, made by fire, which mingles with them earthy particles after the manner I have spoken of treating of the *Alkali's* of *Plants*; But it is observable, that whereas there is a greater proportion of *Spirits* in *Animals* than *Seeds*, these *Spirits* do serve to exalt all the *Salt*; which is the reason that less fixt salt is to be found in *Animals* than *Plants*.

As for what many do say that *Choler* causes an *Efferescency* like an *alkali*, when an *acid* is cast upon it, 'tis a mistake through want of right Observation, for no *Ebullition* at all happens for some time. Nevertheless I will not say, that an *Acid* produces no *Fermentation* in *Choler*, *Bloud*, and other parts of the body, for it does very often really do that; but that is no more than uses to be done in *New Wine*, *Beer*, and other liquors of the like nature. I have already explicated this sort of *Fermentation*.

We should not omit speaking of the *Coagulation* that's made in *Milk* after a *Fermentation* caused either by *Heat*, or some *Acid* put into it.

Methinks here is no need at all of supposing an *Alkali salt*, that ferments with the *Acid* of this liquor, as many suppose for explicating this Effect, since if we consider but the natural composition of *Milk*, we shall find nothing but a
Creamy

Creamy substance swimming on the *Serum*, and mixed only superficially with it, by the intermixture of some *salt*; so that it is in a fitting state of separation, as soon as the *salt* gains a little more motion than it had, whether it be by *Fermentation*, or by encreasing its activity by an *acid* of its own nature. Thus when the *Heat* of the Summer, or fire has stirred up the *acid* that is in the *Milk*, or else some *acid* is poured into it, the edges of the *acid* do cut and divide the Creamy part, to gain a free motion in the *Serum*, and separate into *Curd* all the Butter and Cheese. Now there's no strangeness in the *Precipitation* of the *Curd*, especially when an *acid* has been poured upon the *Milk*, for besides the weight it gains by thickning, some part of the *acids* do mix with it, and encrease its weight; for according as the *acid* that was mingled is stronger or weaker, the *Curd* does *Precipitate* more or less.

Perhaps some will say, for as much as *acid* is always the cause of *Coagulation* in *Milk*, there's no great likelihood that a *salt* of the same nature should be the instrument of uniting the several parts of *Milk*.

But it must be considered, that although there is an *acid* in *Milk* (as no body can doubt, seeing it sowers of it self, when stale) this *acid* is as it were tyed up in the ramous parts of the *Oyl*, so that there it loses all its motion and can't come to action but by rarifying the *Oyl*, and making it fit to mix with the *serous* part; 'tis the due proportion of this *salt*, *Oyl*, and *serum*, that

makes the *Butter* and *Cheesy* part of *Milk*.

Now I hope I have said enough to establish what I have affirmed, that there's no *salt* in nature besides the *acid*, out of which all other *salts* are made, and that the *Alkali salt* has no *Natural existence* in mixt bodies. My discourse will be the better conceiv'd of, speaking of the Operations of Chymistry, and you'll find that by this *Principle*, which I may call the most *Natural* and disengaged of all that have been said till now, I shall be able to give account of many *Phenomena's* that have never been explicated by common *Principles*.

Add to *Pag. 19. lin. 1.*

Of Minerals.

Whatsoever is found *Petrified* in the Earth, or on its surface, is called *Mineral*.

Petrification is made by a *Coagulation* of *acid* or *salt spirits*, that are found in the pores of the Earth.

This *Petrification* differs according to the divers dispositions, or different nature of the Earth, and according to the time that Nature uses in its perfection.

The growth of *Minerals* proceeds from an accumulation, or from several veins of congeled Waters, that do as it were glue together, and these veins are the cause that all the adjacent parts have their *Sinus*, and meetings a travers one another, and not running directly downwards.

These *Sinus*, like so many joints, are of great help to Labourers to cut in the Quarries; for by

by those cavities the stones are in great measure separated before-hand, whereas 'twould be extream hard working them out, if nature had not so concurred.

The growth of *Minerals* is very different from that of *Vegetables*, and *Animals*; for whereas the former does happen through an agglutination of congeled waters, as I have said; the latter is performed by means of *juyces* that insinuate and spread in the vessels and fibres, that *Animals* and *Plants* do consist of.

Metals do differ from *Minerals* in being *malleable*, which the others are not.

They are counted seven, *Gold*, *Sylver*, *Iron*, *Tinn*, *Copper*, *Lead*, and *Quicksylver*, this last is not *malleable* of it self, but is so mingled with the others; but because this is thought to be the *Seed of Metals*, 'tis numbred with the rest.

Astrologers have conceited that there was so great an affinity and correspondence between the Seven *Metals* before named, and the seven *Planets*, that nothing happened to the one, but the other shared in it; they made this correspondence to happen through an infinite number of little bodies that pass to and from each of them; and they suppose these corpuscles to be so figured that they can easily pass through the pores of the *Planet* and *Metal* they represent, but cannot enter into other bodies because their pores are not figured properly to receive them; or else if they do chance to get admittance into other bodies, they can't fix and stay there to contribute

any nourishment; for they do imagine that the *Metal* is *nourished* and perfected by the *Influence* that comes from its *Planet*, and so the *Planet* again the same from the *Metal*.

For these reasons they have given these seven *Metals* the name of the seven *Planets*, each accordingly as they are governed; and so have called *Gold* the *Sun*, *Sylver* the *Moon*, *Iron* *Mars*, *Quicksylver* *Mercury*, *Tinn* *Jupiter*, *Copper* *Venus*, and *Lead* *Saturn*.

They have likewise fancied that each of these *Planets* has his day apart to distribute liberally his *Influence* on our Hemisphere; and so they tell us that if we work upon *Sylver* on *Munday*, *Iron* on *Tuesday*, and so of the rest, we shall attain our end much better than on other daies.

Again they have taught us that the seven *Planets* do every one govern some particular principal part of our bodies; and because the *Metals* do represent the *Planets*, they must needs be mighty *specifick* in curing the distempers of those parts, and keeping them in good plight. Thus they have assigned the *Heart* to *Gold*, the *Head* to *Sylver*, the *Liver* to *Iron*, the *Lungs* to *Tinn*, the *Reins* to *Copper*, and the *Spleen* to *Lead*.

Thus you see in short what some of the *soberest* *Astrologers* do fancy concerning *Metals*, and they draw consequences from hence, which 'twould be too long here to relate. I have told you what the *soberest* among them say; for nothing can be so absurd as what some of them would have us believe.

'Tis no hard matter to disprove these conceits, and shew how groundless they are, for no body ever yet got near enough to the *Planets*, to satisfy himself whether they are really of the same nature with *Metals*, or whether any *Effluvi-ums* of bodies do fall from them to us.

Nevertheless some can conceit that these things are proved by *Experience*; but in truth there's nothing to confirm their Opinion, and we find it every day plain enough, that the Faculties and Virtues are utterly false, which they do attribute to the *Planets* and *Metals*; the *Metals* indeed are of good use in *Physick*, and excellent *Remedies* may be drawn from them; but their effects may better be explicated by Causes near at hand than the *Stars*.

Add to Pag. 19. Lin. 10. Gold is found in *Mines* in several places, both in *Europe*, and other parts of the World; it is usually attended with *Water* and very hard *stones*, such as are extream hard to dig; there are likewise several *stones* that contain particles of *Gold*, such as are called *Golden Marcaffites*, the *Lapis Lazuli*, and *Lapis Armenus*.

Covetousness that has always prevail'd on the minds of men, has not forbore to possess the *Chymists* in hopes to make *Gold*; they have conceited that the production of *Gold* was the *End* that *Nature* always aims at in all her *Mines*, and that she's bindred in her design, as oft as she produces other *Metals* which are called *Imperfect*.

And upon this fancy they have spared no time, nor pains, nor cost, in exalting and perfecting these other *Metals*, and turning them into *Gold*; this is that which they call the *Grand Operation* of all, or the *search* after the *Philosophers stone*.

Some of them to compass their *End* do make a mixture of *Gold* with such other matters as serve to purifie them from their grosser parts, and work their *Preparations* with great fires, others do put them a *Digesting* in *Spirituons* liquors, in imitation of *Nature* that always uses a gentle Heat in her Operations, and so do reduce them into a state of *Corruption*, to draw thereby their *Mercury*, which they think to have the aptest disposition to turn into *Gold*. Others again do search after the *seed* of *Gold*, in *Gold* it self, and these make no doubt to find it there, as the *seed* of a *Vegetable* is more likely to be found in the *Vegetable* it self than elsewhere; in order to this they open the body of *Gold* by proper *Dissolvents*, then set it a *digesting* either by a *Lamp-fire*, or the *heat* of the *Sun*, or that of *Dung*, or some other degree of *Fire*, to be kept all along at an equal height, and such as is nearest to a *Natural* heat, and this to draw out the *Mercury* of *Gold*; for they are perswaded that if they could once obtain this same *Mercury*, sowing it in the *Earth*, it would bring forth *Gold*, as certainly as a *seed* does a *Plant*.

Another sort of these men do take wonderful pains to find out the *seed* of *Gold* in *Minerals*, as in *Antimony* for example, thinking there's a

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Sulphur and *Mercury* in it as like to those in *Gold* as can be. Others hope to find it out in *Vegetables*, and things that come from them, as in *Honey*, *Manna*, *Sugar*, *Wine*, *Rosa solis*, *Rosemary*, *Spleenwort*. And others are not after it in *Animals*, and in their *Gums*, *Bloud*, *Urin*. But the most Curious and delicate of all, who think all the rest but Fools in comparison with them, do hunt after the seed of *Gold* in the *Sun*, and in the *Dew*; for the wisdom of *Astrologers* has found out that the *Sun* is a Body all of *Gold* melted in the Center of the World, and Coppel'd by the fire of the *stars* that environ it about, nay they dare affirm that this same *Gold* when it was a purifying did sparkle as *Gold* does in the *Coppel*.

I should never make an end of this subject, if I should speak of the labours, and pains, watchings, vexations and frettings, and especially the cost these unfortunate men do plunge themselves into, in following their several fancies; they are so extremely prepossessed with the conceit of becoming *Rich* all of a sudden, that they are altogether incapable of any sober admonition, and they shut their ears to any thing than can be said to disabuse them; so that all other *Philosophers*, that are not besotted with their fantastical opinions, are by them thought and called *Prophane*, reserving to themselves the name of the only *True Philosophers*, or *Philosophers paramount*.

But the saddest consideration of all is, to see a great many of them, who have spent all the flower of their years, in this desperate concern,

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in which nevertheless they pertinaciously run on, and consume all they have, at last instead of recompence for their miserable fatigues, reduced to the lowest degree of Poverty. *Penotus* will serve us for an instance of this nature, among thousands of others, he died a hundred years old, wanting but two, in the *Hospital of Tverdon* in *Switzerland*, and he used to say before he died, having spent his whole life in vainly searching after the *Philosophers stone*, that if he had a mortal Enemy he did not dare to encounter openly, he would advise him above all things to give up himself to the *Study and Practice of Alchymy*.

Though I deny not absolutely, that some certain Artist, by a particular method, might have got the way of making *Gold* heretofore, nor that some body may be as lucky in time to come; yet there is more appearance of *Impossibility* than *Possibility* in the case, because of the small knowledge that any of us have of the *Natural Composition* of this *Mixt*; for seeing that *Gold* as well as *Sylver* is drawn from *Mines* environed with *Waters*, it is very probable that these *Waters* do bring along with them some *Saline Principles* that congele and incorporate in *Earths* of a particular composition, and whose Pores are disposed in such a manner as 'tis impossible for *Art* to imitate. Nevertheless in order to make *Gold*, a perfect knowledge of the *Salts* that the *Waters* of the *Mines* do convey, is very requisite, as well as the disposition of the *Matrines* of *Earths* in which they do congeal. Thus we see

see that working after Gold is working in the dark, and *Alabywy* seems very well defined by one thus: *Ars sine arte, cujus principium mendicari, medium laborare, & finis mendicare*, an Art without any Art, whose beginning is Lying, middle is nothing but Labour, and whose end is Beggery.

Gold taken inwardly is thought to be a most potent Cordial, because *Astrologers* tell us it receives its Influence from the Sun; which is as it were the Heart of the World, and by the communication of those Influences to the Heart, it serves to fortifie and cleanse it from all impurities; upon which ground a great many Operations have been invented in order to open this Metal, and separate its Sulphur from its Salt. Moreover this Operation by way of bravery is called *Aurum Potabile*, because this Salt or this Sulphur dissolving in a Liquor, can be taken by way of Potion: And because this *Aurum Potabile* can be thought to be distributed into all parts of the body, they fancy it can drive out every thing that interrupts the Functions of Nature, that it can free him that takes it from all fear of any Diseases for a long time, and can prolong life.

But this Opinion is built upon a weak foundation, and Experience does not confirm any of these great effects; for what assurance can one have or what Evidence is there, that the Sun is such a great friend of Gold, or that it bestows more Influences on it, than other mixt bodies; 'tis a thing that can never be prov'd, and

we see that the *Sun* casts it light and heat in general upon all bodies, without making any difference. Who can understand, that the *Pores* of *Gold* are so disposed, as to have a greater facility of retaining the *Suns* Influences, than other *Metals* or things? This will be full as hard to prove as the other.

But though we should grant the *Astrologers* this supposition concerning the *Suns* Influence on *Gold*, the consequence they draw from it, that therefore it *Fortifies* the *Heart*, would be ne're a whit the truer; for all that we are able to apprehend in *Gold* is, that it is a most compact and weighty body, the union of whose *Principles* is extraordinary close; which is proved from hence, that no Art can instruct us to dissolve it *Radically*, so as to separate its *salt*, and its *sulphur*. This *Gold* being beaten into the thinnest *Leaves* that can be imagined, and taken inwardly receives not the least change in our bodies, and is voided the very same it was before, excepting when *Quicksilver* has been taken beforehand, for it unites with that, as I have said.

Wherefore we must conclude, that if *Gold* has received more *Influence* from the *Sun* than other *Metals*, yet it is never the fitter to dissolve in our Bodies, nor to produce those rare effects that are talkt of.

I know that *stories* are told to prove, that *Gold* does communicate virtue to the bodies of those who have taken it, and that it loses in the body some of its quantity; and among other *stories* 'tis said, that several persons, who had
fed

fed upon *Capons*, nourished with a *Paste* made of a mixture of *Vipers* and *Gold* together, have been cured that way of several *Diseases*; but there's a great deal more reason to attribute this effect rather to the *Vipers* than *Gold*; for we know by experience that *Vipers* taken inwardly without any thing else, do use to produce diverse sensible effects, whereas we observe none at all in *Gold*, when 'tis given alone.

As for the *Loss* of *Gold* in bodies, they prove it by their gathering together all the *Excrements* of those *Capons*, and *Calcining* them, for they could obtain again but the fourth part of the *Gold* that was used in the *Paste* the *Capons* had fed upon. But this proof is as weak as the former; for the *Excrements* of the *Capons* being full of a *Volatile Salt*, that *Salt* may have *Volatiliz'd* and carried away the greatest part of the *Gold* during the *Calcination*, after the same manner as we see several *Volatile* liquors to *sublime Gold*. I know well enough by my own Experience, that there are such *Volatiles* as are able to carry away *Gold*; for having one day mixed three ounces of *Gold* with about three pounds of matter consisting of diverse *Volatile Ingredients*; I put the mixture about a moneth afterwards into the *Coppell*, and the *Gold* appeared very resplendent in the middle of the mixture; but blowing, as we use to do, in its purification, I was astonished to see it *Exalt* away by little and little into the air, until there was not a grain of it left.

Thus

Thus no body can be assured that *Gold* did nourish those *Capours*; but besides, though some of it should be dissolved in the body, as it does in *Aqua Regalis*, which is very hard to conceive; though some of it should exalt, nay though some should plainly glitter in the *Chyle*, here's no proof nevertheless that it produces such wonderful effects.

Now although I have asserted that *Gold* taken alone does not receive any change as for health, yet I value very much several preparations of *Gold* made with *Spirits*; for 'tis these *Spirits* that give certain determinations to *Gold* according to their nature, and make it operate as it does. When I speak of *Aurum Fulminans*, I shall give an instance of what I now say.

Add to *Pag.* 29. The last line of the

Remarks upon Aurum Fulminans.

We need not fear lest *Aurum Fulminans* taken inwardly, and heated by the *stomach*, should cause such a *Detonation* there, as it does when set over the fire in a spoon; for so much the more moisture as comes to it, so much the less noise does it make. Now it can't be question'd, but there is liquidity enough in the *stomach*, besides the liquid vehicle 'tis usually given in. There is no need then of calling in the *acids* of the *stomach*, as some do, to unite with the *salts* of *Aurum Fulminans*, and drive them out of the body of this Metal; for besides that the most clear and disinterested

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Explications and such as fall most under our sense; ought always to be preferr'd; 'twould be too hard a matter to maintain that; 'tis true if you wet *Aurum Fulminans* with the spirit of *Vinial*, or *Salt*, or *Sulphur*, the *Fulmination* is thereby hindred, but this happens from the acids fixing by their weight the *Volatility* of those *Salts* that remain in the *Pores* of the *Gold*.

In the *Chapter* of *Gold* I could reckon up several other Preparations that have been invented, but because they are out of use, I shall not swell this Book with an account of them.

Add to pag. 51.

Remarks upon the Magistery of *Bismuth*.

You must use a large *Bolt-head* to dissolve the *Bismuth* in, because the great *Ebullition* that happens, as soon as *Spirit of Niter* is cast upon it, requires room to move in. You must likewise have a care, as much as you can, of receiving the *Vapours* at your *Nose* or *Mouth*, for they are very offensive to the breast.

This quick and violent *Ebullition* proceeds from the acids quick penetration of the large pores of *Bismuth* as soon as thrown upon it, and the acid violently divides all that opposes its motion. It happens also that the *Bolt-head* grows so hot, that one can't endure ones hand upon it, because the points of the *Menstruum* do chafe against the solid body of *Bismuth* with such force, that you may observe from thence much

much the same heat, as when two solid bodies are rub'd against one another. Add to this, that the great store of igneous particles contained in *Spirit of Niter*, may much increase this heat.

If the *Dissolution* becomes turbid through some impurities in the *Bismuth*, you must pour into it about twice as much *Water* and filter it; for if you should go to filter it without *Water*, it would coagulate like *salt* in the *Filter*, and not pass through. This *Coagulation* proceeds from the acid spirits of *Niter* that are included in the particles of *Bismuth*, which finding too little liquor to swim in and disperse, do gather together into *Crystals*, when the *dissolution* is cold.

This *Magistery* may be made by pouring in great quantity of *Fountain water* without any *salt*, into the *dissolution*, but it is made the quicker, when you use *salt*, and the *Precipitation* is the better because *salt* does encounter and break some of the acids that *water* alone was not able to weaken sufficiently.

Now some difficulty appears here in conceiving how plain *water* alone comes to precipitate *Bismuth*, *Lead*, *Antimony*, which the acid had dissolv'd, and yet can do nothing at all to the *Precipitating Gold*, *Silver*, or *Mercury*, without the assistance of some *salt* or other body; I do imagine that the former having large *Pores*, *Acids* can stick so close in them that *water* may force them out; but *Gold*, *Silver*, and *Mercury*, having finer *Pores* in comparison than the other, do retain acids so very closely that the weak impulses of *water* alone can make no
sepa-

separation; some more active body is requisite to do it.

The *Augmentation* which happens to *Bismuth* when made into a *Magistry*, does come from some part of *Spirit of Niter* that remains still in it, notwithstanding the *Precipitation* and *Lotion*.

Add to pag. 52. Chap.

Of Lead.

Lead serves to *Purifie Gold* and *Sylver*, and may be said to act in the *Coppell*, much after the same manner as the *white* of an *Egg* does in *Clarifying* a *Syrop*, that's boyled in a *Bason*; for as the grois and terrestrious impurities of a *Syrop* do stick to the *white* of an *Egg* by reason of its glutinous nature, and are driven to the sides of the *Bason* in the stirring, so do the *Heterogeneous* parts that were mixt with *Gold* and *Sylver*, stick unto the *Lead*, and by the fire are driven to the sides of the *Coppell* like unto a *Scum*.

Add to pag. 53.

Remarks upon Calcination of Lead.

There happens an observation in the *Calcination* of *Lead*, as well as several other things, which very well deserves some reflection. 'Tis that although the *Sulphurous* or *Volatile* parts of *Lead* fly away in the *Calcination*, which loss

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should indeed make it weigh the less, nevertheless after a long *Calcining* 'tis found, that instead of losing it increases in weight.

Some trying to explicate this *Phænomenon* do say, that as long as the violence of the flame does open and divide the parts of the *Calx* of *Lead*, the acid of the *Wood* or other matter that burns, does insinuate into the pores of this *Calx*, where 'tis stopt or fixt by the *Alkali*; but this reason will not hold, when 'tis considered that this *Augmentation* comes to pass as well when *Lead* is *Calcined* with *Coals* as *Wood*, for *Coals* contain only a fixt *Salt* that rises not at all.

'Tis better therefore to refer this effect to the disposition of the pores of *Lead* in such a manner, that part of the fire insinuating into them does there remain imbodyed, and can't get forth again, whence the weight comes to be encreased.

If you would revive this *Calx* of *Lead* by way of *Fusion*, its parts do lueez and expels the igneous particles that were inclosed, and the *Lead* does thereby weigh less than it did when reduced into a *Calx*, for by this means the *Sulphureous* parts are separated and lost.

Add to pag. 60.

Remarks upon the Burning Spirit of Saturn.

If you use six ounces of *Salt* of *Saturn* in your *Distillation*, you'll draw an Ounce and six drachms of liquor, and there will remain in the

Retort

Retort six ounces and six drachms of a blackish and yellow matter; and if you put this matter into a *Crucible*, setting it in the fire, 'twill melt, and you'll regain four ounces of *Lead*, and half an ounce, or it may be six drachms of a yellow earth coloured like *Litharge of Gold*.

'Tis evident from this Operation that an ounce and six drachms of the more Acid parts of *Vinegar* are sufficient to impregnate four ounces and two drachms of *Lead*, to reduce it into *Salt*; but the strangest thing that happens to it, is the great change that *Acids* do give it, insomuch that 'tis not to be known again in the least.

The *Augmentation* that the *Lead* in the *Retort* does here receive, is as plain as may be; for six drachms are taken out of it at last, more than were put in of *Salt of Saturn*, besides an ounce and six drachms of liquor that were drawn out. So that we must necessarily conclude, that the four ounces and two drachms of *Lead* are grown encreased two ounces and an half.

'Tis probable enough that the more rarified the *Lead* becomes, the more capable 'twill be of igneous particles; for although the *Salt of Saturn* is not suffer'd to remain long in the fire, yet the *Lead* encreases apace. Possibly it may be that as fast as the *Acids* go out of it, igneous bodies enter in their place, and open likewise the *Pores* of *Lead* by their nimble motion; but these *Pores* must needs be so disposed as to shut again like valves, and hinder the return back of those fiery parts.

When this *Calx* is *Calcined* in an open fire in a *Crucible*, without stirring it, the parts of *Lead* close together and expel the fiery particles, so that the *Lead* *revives* as it was before, and recovers its *Natural* gravity.

The matter when shut up in the *Retort* would never be able to *revive*, let the fire be made never so strong, because the igneous particles would find no liberty to get out.

The *Yellow earth* that's found in the *Crucible* seems to be of a Golden colour, 'tis a terrestrious and bituminous impurity that the *Lead* is separated from. There should be indeed but two drachms of it, because four ounces of *Lead* are drawn off, wherefore the *Augmentation* must needs be from the fiery parts that remained in it as in a *Calx*.

Add to pag. 61. Chap. 6. lin. 7.

Of Copper.

Because *Copper* contains in it a *Corrosive* quality, I would advise no body to use it *inwardly*.

Copper takes *Rust* very easily, for if you leave but a drop of *Water* some hours upon a piece of it, it creates a *Verdegrease*. Have a care of *drinking* water, that has lain in *Copper* vessels, for it always dissolves some portion of it, which appears easily from the taste it leaves in it.

'Twill not be altogether amiss to make mention here of an effect that is no less strange than usual.

'Tis that Water or any other liquor that's heated
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or boil'd in a *Copper* vessel for a whole day together, savours not at all, or not so much of the *Copper*, provided 'tis not remov'd off the fire all the time, as other *Water* warm'd in a like vessel, and put from the fire but an hour; for whereas *water* alone can dissolve something of the *Copper*, it would seem that being aided with the heat of the fire, it should partake of its nature the more easily. Now in my opinion this is the most rational explication that can be given of this matter.

Every body may perceive that when the *water* begins to heat in a *Bason* or other *Copper* vessel, that's set over the fire, little *Atoms* do rise at bottom like the stirring of a powder, and these *Atoms* do encrease according as the *water* receives more heat, so that at length they make it boil a high; these little *Atoms* can have no other cause than the fiery particles, which passing through the *Bason*, do drive the *water* upwards apace, and rarifie its parts; for this reason 'tis that the *water* is not able to dissolve any of the *Copper*, for being continually raised upwards, it can make no impression upon the bottom of the *Bason*.

Perhaps some will tell me, the liquor might take the impression of the *Copper*, at the sides of the *Bason*, but it is easie to imagine that though there don't pass through the sides so many fiery particles as do at the bottom, there do pass nevertheless enough to hinder the liquor from sticking to or dissolving any particles of the vessel.

But now on the contrary the Bason being remov'd from off the fire, and the motion of the igneous particles being quite ceased, the liquor impregnates of the *Copper* nature with ease, nay and so much the more easily as the fire has rarified the metal, and rendred it the more proper for dissolution.

Every thing seems to confirm this Opinion, for if any liquor is put boiling over a strong fire in a *Copper* vessel, 'twill not impregnate in the least, but if you place it upon a small fire, and leave it so for some time, then because there will not pass enough fiery particles, to cover all the surface of the vessel, and raise up the liquor, 'twill take some taste of *Copper*; but this taste will not be so strong as if you had left it the same length of time in such a vessel off the fire, after it had been warm'd.

Liquors that are full of *Salts* do take the impression of *Copper* much more easily than those that are not. Thus *Confectioners* do take notice of what I have mentioned; for though they boil their *Confections* in vessels of *Copper* for a considerable time, they find 'em taste nothing of the *Copper*, but they know that if they should leave them but half an hour in the vessel taken off the fire, they would be tainted with a most loathsome *Copper* taste.

We may learn from this Discourse, not to use a *Copper* vessel, when we have a mind to boil or heat a liquor gently, and when we do think fit to use it, to be sure to keep a good brisk fire underneath, and not to let what we have boil'd,
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cool afterwards in a vessel of this nature.

Another difficulty does here offer it self on this subject, and it is to know why a *Kettle* that has been taken off the fire, is not so hot at *bottom* as at the *sides*, so that as soon as 'tis removed from off the fire, one may touch it at bottom without burning ones finger, which can't be done at the sides without present scalding.

The reason of which is, that the fiery particles tending upwards through the bottom of the *kettle*, which is flat, in a direct line, don't make any stop in passing through, having but a little distance to conquer before they come into the liquor; but those that rise on the sides, finding a longer space to make upon the *kettle*, do many of them stop in the pores of the *Copper*.

'Tis not the same thing in *Kettles* that are made in another form, whose bottom is *Globular*, because the fiery particles rising up in an indirect line, do find more to do to pass it through, than in a flat bottom, and so by consequence more of them do stop in the vessel it self.

Yellow Copper is a mixture of *Lapis Calamitarius* and *Copper*, and vessels that are made of it give less impression to liquors than the others.

Add to pag. 68. lin. 6. Chap.

Of Iron.

Iron is found in many *Mines* in *Europe*, in form of a *Stone* or *Marcassite*, which much resembles the *Loadstone*, but this last is more heavy

and brittle than *Iron*. The *Loadstone* is also found in *Mines* of *Iron*, and may be reduced into *Iron* by a strong fire. *Iron* for its part does easily acquire the virtue of the *Loadstone*, as every body knows, so that these bodies do seem to differ only in the figure of their Pores, as has been very well observed by our *Modern Philosophers*.

Iron in the stone is melted in large Furnaces made on purpose, both to purifie it from some earth, and to bring it into the Form we desire. Having continued some time in *Fusion*, it *Vitri-fies* as it were, and much resembles an *Email* of several colours; and it enters indeed into the composition of ordinary *Emails*, with *Lead*, *Tinn*, *Antimony*, *Sand*, the *Saphire*, the *Stone of Perigord*, (a Province in France) *Gravelled ashes*, and the *ashes* of a Plant called *Kali*. Although *Mars* does contain an *Acid Vitriolick Salt*, yet it ceases not being an *Alkali*, for it *ferments* with *Acids*; and no body needs wonder at this effect, when they consider there is more *Earth* than *Salt* in this *Metal*, and this *Earth* confining this *Salt* within it, retains *Pores* enough to receive the Points of *Acids* when thrown upon it, and so do the office of an *Alkali*; for as I have said speaking of the *Principles*, it is sufficient for a body to be called an *Alkali*, if it has its *Pores* so disposed as that the *Acids* may be able through their motion violently to divide whatsoever stands in their way.

Mars is almost always *Astringent* by *Stool*, by reason of its *Terrestrious* parts, and *Aperi-tive*

rive by *Urine*, not only by reason of its piercing *Salt*, but also because when the body is bound, the humidities do more easily filter by way of *Urine*.

Add to pag. 70. The last line of the
Remarks upon Opening Saffron of Mars,

Seeing some persons have pleased to contradict the *Remarks* I have made upon the Effects of *Mars*, and particularly concerning the preference I have given *Iron* to *Steel* for Physical uses, I have thought it not convenient to end this Chapter, before I have laid down and Answered all their *Objections*.

First then they say, that because the different substances of *Mars* cannot be separated, as those of *Animals* and *Vegetables* can, 'tis in vain an *Aperitive* virtue is attributed to its *Salt*.

Answer. I grant all the substances of *Mars* can't be separated so easily as those of *Animals* and *Vegetables*; but because we find *Salts* to be *Aperitive*, and commonly Remedies that are so, are full of *Salts*, and that *water* in which *Rust* of *Iron* has steeped for some time, is proper to open by way of *Urine*, it seems to me rational enough to attribute this effect of *Mars* principally to its *Salt*; for if the *water* has carried off any taste or penetrating quality from *Iron*, there's nothing at all in *Mars* that is able to contribute such a virtue to it, besides the *Salt* therein dissolved.

Secondly,

Secondly, they say, the *Earth* and *Salt* of *Mars* being united and in a manner inseparable, cannot act but by consent of both, and receive together joynly the good or bad impressions, that may happen to them.

I *Answer*, there's no reason to think the *Salt* of *Mars* absolutely inseparable from the *Earth*, for the water in which this Metal has steeped or boiled, after Filtration does contain a *Vitriolick* taste, and *Aperitive* quality. Now 'tis the effect of *Salt* to dissolve imperceptibly in Water and drive by *Urine*, as I have said; but if any body would take the pains to steep and boil gently the rust of *Iron* a good while in water, then Filter it, and to Evaporate the liquor over a small fire to a Pellicule, he'l by *Crystallization* or by an entire evaporation of the humidity, gain a small quantity of *Salt*; and 'tis probable enough there was much more in the water, as may be collected from the strong taste it had of *Mars*, but it being of a pretty *Volatile* nature, if fum'd away in the *Evaporation*. I do not say nevertheless that the close connexion of *Earth* with the *Salt* of *Mars* is altogether unuseful for this effect; on the contrary, I do conceive that this *Earth* rendering the *Salt* more heavy than otherwise it would be, does help to drive it forwards, and causes the *Mars* sometimes to penetrate as much by its gravity as by its *Salt*; but we must attribute the principal virtue to the Vehicle which is *Salt*, since without that, the *Earth* would be a dead matter, and would have no more action than other *Earths* bereaved of their *Salts*.

Thirdly,

Thirdly, They object, we must not think the hardness of the parts of *Steel* above *Iron*, whose Pores are more open, does render it less proper for all sorts of Preparations, seeing *Spirits of Vitriol*, and many other *Acids* are found to dissolve with the same ease both *Iron* and *Steel*.

I Answer, that if *Corrosive Spirits* do dissolve *Steel*, they can dissolve *Iron* more easily; and whereas a smaller quantity of them can operate upon *Iron* than *Steel*, a better effect does thence follow.

Fourthly, 'Tis objected that the solidity of *Steel* may be an advantageous circumstance to it, for the better fixing the dissolving Juices that are in the stomach, and that for *Metals* the pure are to be chosen before those that are not so.

I Answer, that instead of the solidity of *Steels* being helpful to the stomach, 'tis certainly of great prejudice to it, as well as to those other parts 'tis distributed into; for the juices that are found in the stomach being but weak dissolvents, are not able to penetrate nor rarify this metal, if it is too hard; so that they leave it crude and indigest, heavy and incommodious to this part: Wherefore it passes away by Stool, without any good effect, as often happens. But now if a little of this *Steel* does happen to pass along with the *Chyle*, it rather causes than takes away Obstructions, for by insinuating into small vessels, it stops in the narrow passages, and causes grievous pains.

For what is said concerning the Purity of metals, it is of great use to Tradesmen, for they
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by *Purifying metals* from their more rarified and *Volatile* parts, do make them the less *Porous*, and so the less liable to suffer prejudice from the Air or time. Thus *Steel* is much fitter for *Ustensils* than *Iron*, because its *Pores* are closer laid together, and it takes not *rust* so soon as *Iron*; but in *Remedies* 'tis not the same thing, for those *metals* that are more *Rarified*, and are easilier dissolved in the Body, are such as we find best effects from, for the reason I have given. So that what *Workmen* call *Purity*, is often but an *impurity* in *Remedies*.

Fifthly, They say, if one would hope to find a distinct *Salt* in *Mars*, 'twould be more likely to find it in that which is *Purified*, than in the *Faces* which are separated from it, and which are indeed but the *Impurities* of *Iron*, that *Steel* is made of.

I Answer, there would be some reason to think that *Salt* might be more easily found in *Steel* than *Iron*, if in the making of *Steel*, *Iron* were simply *Calcined*, without adding *Nails* and *Horns* of *Animals* in the *Calcination*; for then it might be said that the *Sulphur* of *Iron* being in part evaporated, its *salt* would be the more *Soluble*: but we must consider that the *Volatile Salts* which come from these parts of *Animals*, being piercing *Alkali's*, do destroy the *Acid salts* of *Iron*, and do thereby render the *Steel* more compact, and unfit to take *rust*, because the *salts* which by their motion did rarifie the *metal*, are fixed, and as it were *mortified*, and have not the capaciai of acting as they did.

did. This is the reason why a *Plate of Steel* that has infused in *Water* will not give so great Impression to it, as a *Plate of Iron* Calcined, of the same weight, infusing the same time, will do.

Another thing remarkable in the *Calcination* of *Iron* to turn it into *Steel*, is that it is thereby deprived of its more *Volatile salts*, which should have most effect with it, in hopes to free it from *Impurities*, and that which is called the *Scories*, is the better part of *Iron* that has been rarified by its *salt*. Thus for the same reason that some are pleased to call the *rust* of *Iron* its *dross*, the whole *metal* may deserve the same appellation, all of it being capable of *rusting*, if it is but laid in the open air.

Add to pag. 92. To the end of the

Remarks upon Reviving Cinnabar into Quicksilver.

I could attribute the invention of this discourse to my self, being the very first that thus treated of this matter in *France*, and maintained it in *publick meetings*; but I am not possessed with that vanity of *Authors*, I leave it to those that love it: I had no affectation to make a *Book* on purpose concerning it, but have only mentioned it as a thing incident to the Subject I treated of. I shall only say by the by, that those who make pretence of first finding it out, have hapned to make their complaints a little too late, having

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Printed their Book a year after mine, and three years after I held a Publick Discourse of it at Monsieur Lannay's, nor to speak of what I taught allong time before in the first Courses of Chymistry that I shewed.

Those who desire to be further instructed upon this Subject may read Monsieur Blegny's Book Treating of Venerable distempers. 'Twas Translated into English 3 or 4 years ago, and Printed for Mr. Burrel the Bookseller under S. Dunstons Church.

Some thinking to invalidate what I established in the first Edition of my Book, do say that mercury cannot be absolutely called an alkali, because the alkali that is in mercury is but one part of its Composition, and is not to be separated from its other parts.

To Answer this difficulty you need but only read in the Remarks that I have made upon the Principles, how it is I do explicate the nature of an Alkali, and you'll find that although the name Alkali comes from the Salt of a Plant called Kali, that is, soapwort, yet all bodies that cause a sudden Effervescency with Acids are called Alkali's, without any need of their containing any Alkali salt within. So that I have no occasion to enlarge this Book without reason, by Answering all the little Objections that have been made to me upon the supposition of Mercury's being a pure Alkali. 'Tis likely enough that those who have rais'd them, have not read with Attention what I have said in my Remarks upon Mercury. For there are Solutions enough. I shall speak nevertheless to some of the Principal ones.

First,

First, It is *Objected* that if *Mercury* is an *Alkali*, and the *Venercal* venom an *Acid*, this same *Acid* should certainly fix it, whereas the Dissolutions of it that are made by the *Juices*, do only serve to entcrease its *Volatility*, and render it *Corrosive*, instead of being at all sweetened by it.

I *Answer*, it is as false to say, that *Mercury* is *Volatilized* by the *Acid Juices* of the *Venercal* venom, as it is that *Mercury* mixed with *Acid Spirits* to render it *Corrosive*, should be *Volatilized* by the same *Spirits*. On the contrary, *Mercury* alone does easily *Volatilize* by the heat of the body, and nothing but *Acids* are able to fix it at all. I thought I had sufficiently explicated my self as to this when I said that sometimes *Mercury*, finding not in the Body enough *Acid Spirits* to fix it, does pass by *Transpiration*.

As for the *Corrosive* nature that *Mercury* receives, we must attribute it to the *Disposition* of its *Pores*, and the abundance of *Acid* points it impregnates with, and seeing it will not sweeten the *Acidity* of *Salt* and *Vitriol*, with which it is mixed to make a *Sublimase Corrosive*, why should we expect it to sweeten the *Acid Juices* of the body? I do not pretend nevertheless that it never *Dulcifies* at all; for I do conceive it may destroy much of their force by dividing and breaking their points, when the *Acids* are but few, as does happen in *Mercurius dulcis*.

Secondly, 'Tis *Objected* that if the venom of the *Pox* were an *Acid*, it might then be Cured by the use of *Alkali Salts*, either fixt or *Volatile*,

as by *Crabs-Eyes*, *Perles*, *Corals*, and such like bodies as are wont to kill and sweeten *Acid* humours.

I Answer, we often find that *Volatile Salts* do give some ease to those that are troubled with the *Venercal distemper*, whether it be by opening the *Pores*, and so making the subtler part of it perspire away, or that by being *Alkali's*, they do absorb some part of it. For this reason some do use to give their Patients the *Volatile Salt of Vipers* several mornings together, but these *Alkali's* are in truth of too weak a nature to carry off such an *Acidity*, after they are impregnated with it, as *Mercury* is able to do without losing its nature. They are *Nets* of too fine a make, to catch such keen and active bodies; if these *Salts* do destroy some part of the *Acidity*, they destroy themselves likewise in the conflict, that they can have no further operation, wherefore there's need of a more powerful *Volatile Alkali* than these *Salts* are, to eradicate the *Acidity* of *Venercal Poyson*.

As for *Fixt Salts* and *Alkali* bodies, as *Perle*, *Coral*, *Crabs-eyes*, whereas they have no *Volatile* quality in them, and their tendency is wholly downwards, 'tis very uncertain whether ever they reach to *Venercal tumors* which commonly rise in the *Joints*, by reason of the long way they have to pass thither, and the *Juices* they have to encounter in their passage, which may in all likelihood change their nature; but suppose they were carried to those *Tumors* with the same qualifications they were taken with, they

they would only serve to weaken a little this *Acidity*, without being able to carry it off, and so they would only give a little ease, without removing *Radically* the *Ferment* of the Distemper, as *Mercury* is able to do.

It may be further asked why *Sublimate* does not fill the substance of the *Brain* with *Ulcers*, as well as it does the *Mouth*.

I Answer that this *Sublimate* being in the *Brain*, finds it self so clog'd with a Mucilaginous moisture, that it is fain to lose there some parts of its *Acidity*; so that it can do nothing else but cause a *Fermentation*, which makes the *Flegm* purge away through the *Salivating vessels*, and this it is that causes the *Spittle* of those who have a *Flux*, to be so sharp and stinking.

This sharp *Flegm* may also, as it passes in the *Mouth*, encrease the number of *Ulcers*, for the *mouth* is as it were the *sink* of the whole body upon this occasion.

Add to pag. 94. the beginning of the

Remarks upon Sublimate Corrosive.

Not half the *Spirit of Niter* is requisite to dissolve a pound of *Mercury*, as is for the same weight of *Bismuth*, though the *Pores* of this last are larger, and its parts more disposed for division; the reason of which is, that *Mercury* being a *Volatile*, and the parts very little united together, it divides almost of it self, and is much more easily born up by *Acids*, than would

a body that has union in its parts, and whose tendency is downwards, such as *Bismuth*.

This Operation may be done if one will, by only mixing crude *Mercury* with *Salt* and *Vitriol*, without the trouble of dissolving it with *Spirit of Niter*; but there's a great deal of time requisite to incorporate them together, for to make the *Quicksilver* quite disappear. Again there's a fume that rises up to the Nose that is very unwholsom. Now that which is aim'd at in dissolving it, and reducing it into a white Mass, is only to fit it the better for mixture.

Add to pag. 96. the end of the same

Remarks.

Those who have thought fit to Criticize upon what I have said about the effects of *Mercury*, would methinks, have spoken more to the purpose than they have done, if they had objected to me a difficulty that I have made to my self since the first *Edition* of my Book. 'Tis this, If the *Mercury* that is given in order to raise a *Flux*, does joyn with the *Acid salt* of the humors, and so makes a *Sublimate Corrosive*, after the same manner as 'tis made in the *Matrafs*, when 'tis mixt with *Salt* and *Vitriol*; this *Sublimate* of the body can't be perfected, as long as there is any watry humor in the part, wherein *Mercury* is mixt with *Acids*; just as none of it can be made in a *Matrafs*, until all the *Phlegm* that's in it, is evaporated away. Now it is not to be

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conceived, that there should ever happen such a Desiccation to the body, for it would be *Corroded* by *Mercury* loaded with *Acids*, before it could *Sublime*.

To answer this Objection I say, That although I have made a comparison between the *sublimation* of *mercury* that's made in the body, and that which is done in a *Matrass*; nevertheless there is this difference between them, that the first is not only made with *Salts* extremely *Volatile*, but is likewise assisted or carried on by the motion of the humours with all their humidity up to the Head, whereas this other is made with *Fixt Salts*, whose *Acidity* is so strongly rooted in the Earthy part, that it can't be separated from it, without a very considerable fire.

Nor must we think that the *Mercury* in the body is loaded with as many and as strong *Acids*, as that in the *Matrass*; for if it were so, it would carry destruction, and cause a *Gangrene*, wheresoever it came; but it is enough, that its *Pores* are in part impregnated with them, sufficient to diminish a little of its *Volatility*, and cause those prickings and pains which do happen during the *Salivation*.

Add to pag. 97. The

Remarks upon Mercurius Dulcis.

The *sweet Sublimate* that is made in a *Matrass*, loses half an ounce each *sublimation*; so that an ounce and a half is lost in 3 times when the Operation is done.

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Six

Six drachms of *Scories* and light earth are found at bottom and consequently there is but two drachms of matter carried off each *Sublimation*. But if you would try this Operation in *Viols*, the *sublimate* would lose half an ounce more, as having a larger aperture to fly out at, than in a *Matrass*.

Add to pag. 101. The

Remarks on White Precipitate.

The *Dose* of *White Precipitate* must be less than that of *sweet sublimate*, because it contains more *Acid Spirits*; but if you would *Sublime* this *Precipitate* all alone in a *Matrass*, over a gentle fire, you'd obtain a *Sublimate* quite as *sweet* as the other; because the fire having acted upon it breaks most of its points, and then it may be given in as great a *Dose* as ordinary *Mercurius Dulcis*.

The *Volatile Spirit* of *Sal Armoniack* containing an *Alkali Salt*, does much help the *Precipitation*, for its agility carries it into every recess of the liquor, where the *Sea-salt*, whose parts are not of so active a nature, was not able to go: which is proved from hence, that if you make use only of *Sea-salt* dissolved in water to make this *Precipitation* with, it will then happen that if after pouring off the clear liquor, which swims upon the *Precipitate*, into another vessel, you drop the *Spirit* of *Sal Armoniack* into the liquor, there falls a considerable quantity of
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Mercurial Precipitate, which may serve like the other. If instead of the *Volatile Spirit* of *Sal Armoniack* you'd use the *Oyl of Tartar* made *per Deliquium*, the *Precipitate* would then be *Reddish*.

Add to pag. 102. The

Remarks upon Red Precipitate.

Many Authors have thought they could encrease mainly the *Redness* of this *Precipitate*, by *Cohobating* it, or distilling *Spirit of Niter* three times upon the *white mass*; but I have found by experience in both these ways of Operation that these Circumstances are to no purpose.

The *white Mass* which remains after Evaporation of the humidity is a mixture of *Mercury* with a great many *Acid Spirits*, for it weighs three ounces more than the *Mercury* did which was dissolved; it is extreme *Corrosive*, and fiery, if applied to the flesh, but according as it is *Calcined* in order to make it *Red*, the edges of the *Spirit of Niter* which caused the *Corrosion* do pass off, and fly into the Air; whence it comes to pass, that the more we desire to encrease the *Redness* in the *Calcination*, the less it weighs, and the less it corrodes. Some *Chirurgeons* observing this effect do choose the *Precipitate* that is not so *Red* as usual, when they would make a quick *Eschar*.

If you still continue the fire some hours under the *Red mass*, it will *sublime*, and still retain its colour;

colour; this *sublimate* is not so *Corrosive* as the other; which makes me think that the points of *Spirit of Salt* are necessary to make a *sublimate* very *Corrosive*. The reason why it will *sublime*, is because the *Mercury* being discharged of a great many *Acid Spirits*, that held it *fixed*, has power to rise with those that remain. But because these remaining *Spirits* do moderate a little its *Volatility*, it makes a stop in the middle of the *Viol*.

Some do put *Red Precipitate* into an Earthen Pot, and pour upon it *Spirit of Wine* well *Rectified*, then fire it, and when the *Spirit* is consumed, they add more, and burn it as before; they repeat *Spirit of Wine*, and burn it six times together, and then they call this Preparation *Arcanum Corallinum*. The *Spirit of Wine* by burning does carry off some edges of the *Precipitate* and joyns it self to the rest, so that this *Precipitate* is sweetned and rendred fit to be taken inwardly.

If by way of curiosity you pour *Spirit of Vitriol* upon common *Red Precipitate*, such as I have described, a *Dissolution* will soon follow, because *Spirit of Vitriol* joyning with the *Spirit of Niter* that remained in the *Precipitate*, an *Aqua Fortis* must happen from their union, which is able to dissolve imperceptibly the parts of *Mercury*; but this *Dissolution* will happen without any *Ebullition*, because the *Mercury* has been already rarified by an *acid*, so that the *Spirit of Vitriol* does only dissolve them without making any commorion. The *Dissolution* is clear
like

like other Dissolutions of *Mercury*, without any manner of appearance of *Redness*, and the same Preparations may be made with it as are used to be done by the *Dissolution* of *Quicksilver* in *Aqua fortis*.

If instead of *Spirit of Vitriol* you pour *Spirit of Salt* upon the *Red Precipitate*, it turns presently into a curious *white*, because the *Spirit of salt* breaks the force of the *Spirit of Niter* that was in the *Red Precipitate*; and the same thing must happen here as when *Spirit of salt* is poured upon the *Dissolution* of *Quicksilver*; for although *Red Precipitate* is a *Dry* body, yet it is nothing else but a mixture of *Quicksilver*, and *Spirit of Niter*.

As for the sudden change of *Colour*, it is indeed somewhat strange, that a matter which is grown *Red* by *Calcination*, should in a minutes time turn so exceeding *white*.

This Effect can be attributed only to the dislocation which the *Acid Spirit* of *salt* does cause in the parts of *Red Precipitate*, and to the disposition it puts them anew into, so that their *Superficies* is put into a capacity of *Reflecting* the *Light* in a *right line* to our eyes, to give the appearance of a *white colour*; for if by means of another sort of liquor or else by fire and some *Alkali* body, the *Disposition* of the parts of your *Precipitate* is again changed, it will obtain some other *Colour*, or else it will return and revive into *Quicksilver*.

If you pour the *Volatile spirit* of *Sal Armoniack* upon *Red Precipitate*, it turns into a grey powder,

powder, but if you throw a great deal of water upon it, it becomes a *milk*, though none of the whitest. The same thing happens, when you drop *Spirit of Sal Armoniack* into the *dissolution* of *Quicksilver* made with *Spirit of Niter*; for soon after the *Effervescency* is over, a grey powder is seen to *Precipitate*, and if you add to it water, it becomes a *milk* of the same whiteness as the other.

Common *Red Precipitate* therefore is subject to the same alterations as the *Dissolution* of *Mercury*, the *Red colour* giving no particular impression to it; which truly is a good proof that *Colour* is no real thing, but wholly depends upon the *modification* of the parts.

Other Precipitates of Mercury.

Mix 7 or 8 ounces of *Sublimate Corrosive* powdered, in a glass or marble Mortar with 16 or 18 ounces of warm water, stir them about for half an hour, then let the liquor settle, and pour it off by *Inclination*, filter it, and divide it into 3 parts to be put into so many Viols.

Pour into one of these Viols some drops of the *Oyl of Tartar* made *per Deliquium*, there falls immediately a *Red Precipitate*.

Drop into another of these Viols some *Volatile spirit of Sal Armoniack*, and you have a *white Precipitate*.

Pour into the last of these Viols about a spoonful of *Lime-water*, you have a *Yellow-water* that is called *Phagadenick-water*, or a water for Ulcers,

cers, because it is good to cleanse and heal *Ulcers*, the *Chirurgeons* do very frequently use it, especially in *Hospitals*; if you let the liquor settle, 'twill let fall a *Yellow precipitate*.

To obtain these three *Precipitates*, you have only to pour off the water by *Inclination*, wash them, and dry them apart.

Red precipitate may be used like that I described before, but it is not so strong; 'tis the truest *Red precipitate* of any.

White precipitate has the same virtues as the other.

Yellow precipitate may be used in *Pomatus* for the Itch, half a drachm or a drachm of it is mixed with an ounce of *pomatum*.

The *Sublimate* which remains at the bottom of the Mortar, being dried may be used in *pomatus* for the Itch like *Yellow precipitate*.

Remarks.

Sublimate being *mercury* loaded with *Acids*, common *water* is able to dissolve some of it, because these *Acids* do rarifie it, and make a kind of *salt* of it; but because there are not *Acids* enough in it to dissolve all the *mercury*, the most compact part of it remains at bottom, the liquor is filtred to clear and purifie it the more, it is as clear and transparent as *Fountain water*.

If by further way of Curiosity, you should drop into the Viol of *Red precipitate*, that I now described, some *spirit of Sal Armoniack*, and would shake the liquor a little, it would presently

ly turn *white*, and your *precipitate* would be *white*; but if instead of *Spirit of Sal Armoniack* you would use *spirit of Vitriol*, an *Ebullition* would rise in it, and the *Red liquor* would become *clear* and transparent as common water.

Because the *Oyl of Tartar* is an *Alkali salt* dissolved, it breaks the edges of the *Acid* which held up the *mercury* imperceptible, and serv'd as *Swimmers* to it in the *Water*, so that this *mercury* having nothing left to bear it up, must needs *precipitate* by its own weight. The same thing happens when the *Spirit of Sal Armoniack* is thrown upon the other part of the *Dissolution of sublimate Corrosive*. For this *spirit* being in like manner an *Alkali*, produces the same effect as the *Oyl of Tartar*.

But although *Alkali's* do all agree in this that they all break and destroy *Acids*, nevertheless there is always some difference in their action.

And this evidently appears in those differently coloured *precipitates*, for this diversity can be attributed only to this, that they having in several manners wrought upon *Acids*, do dispose and *modifie* the parts of the *precipitated* body, so as they may be capable of making different *Refractions of Light*.

These *precipitates* are no longer *poisons*, though they come from *sublimate Corrosive*, and there's the same reason for it as there is for the *precipitations*; for seeing that which gave the *Corrosion* was an *Acid*, when this *Acid* is destroyed by such powerful *Alkali's* as are the *spirit of Sal Armoniack*, and *Oyl of Tartar*, that which remains must become *sweet*.

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When *spirit of Vitriol* is thrown upon the liquor of *Red precipitate*, there rises an *Ebullition*, because the *Acid* does penetrate the *Alkali salt* of the *Oyl of Tartar*, and this *Alkali* being destroyed, the *Acid* dissolves what was precipitated before, whence it comes that the liquor clears up, and turns into *poison* as it was before.

If you would again pour *Oyl of Tartar*, then *spirit of sal armoniack* upon it, there would happen new *Red* and *White precipitates*, which might again be dissolved, and the liquor made clear again, by adding to it *spirit of Vitriol*, but a greater quantity of *Spirit* must be used than before.

Add to Chap. 9.

Of Antimony.

Although nothing but a *Metallick* substance mixt with *Sulphur* can be perceived in the analyzing of *Antimony*; nevertheless considering its *Figure*, somewhat like that of *salt-peter*, and its *Emetick* quality, which can proceed from nothing but some *punction* of the *stomach*, there's reason to think it contains an *Acid salt*; but because the edges of this *Salt* are sheathed in a great deal of *sulphur*, it cannot exert its activity, without opening a way for it, either by *salts* which divide the *sulphur*, or by *Calcination* which carries off its grosser part. Notwithstanding it is not to be understood that the *Emetick* faculty of *Antimony* does consist in this salt alone;

alone; for if it were alone, it would no more produce this Effect than other *Acid salts* do, but it is assisted by the *sulphur*, which serves for a Vehicle to *exalt* it towards the upper *Orifice* of the *stomach*. Thus *Antimony* may be said to *Vomit*, by reason of the *Saline sulphur* it contains.

Add to pag. 109. The

Remarks upon Common Regule of Antimony.

If by way of curiosity you would *Calcine* four ounces of *Regule of Antimony* powdered, in an Earthen cup unglazed, stirring it all the while with a *Spatule*, there will rise up a vapour for an hour and a halfs time, or thereabouts, and when the matter fumes no longer, it turns into a *grey powder*, that weighs two drachms and a half more than the *Regule* did at first.

This *Augmentation of quantity* is the stranger, for that the fume which ascended from it during the *Calcination*, should seem rather to have diminished its weight. It must be therefore, that a great many fiery particles have entred into it, in the room of that which fum'd away.

This *Fume* proceeds from some grosser *sulphur*, that remained in the *Regulus*, and indeed it smells strong of the *sulphur*.

Add

Add to pag. 112. to the

Remarks upon Regulus of Antimony with Mars.

After the first *Purification*, ten ounces of *Regulus*, and thirteen ounces of *scories* do remain; after the second *Purification*, nine ounces and a halfe of *Regulus* do remain; after the third, eight ounces and two drachms of *Regulus*; and after the fourth you'll have seven ounces, and six drachms of *Regulus*.

The *Star* which appears upon the *Martial Regulus of Antimony* when it is well *Purified*, has given occasion to the *Chymists* to reason upon the matter; and the greatest part of these men being strongly perswaded of the *Planetary Influences*, and a supposed correspondence between each of the *Planets*, and the *Metal* that bears its name, they have not wanted to assert, that this same *Star* proceeded from the impression which certain little bodies flowing from the *Planet Mars* do bestow upon *Antimony* for sake of the remaining *Iron* that was mixed with it; and for this reason, they wonderfully recommend the making this Preparation upon *Tuesday* rather than another day, between 7 and 8 a clock in the morning, or else between 2 and 3 in the afternoon, provided the weather be clear and fair, thinking that day which is denominated from *Mars* to be the time that it lets fall its *Influences* most plentiful of any. They have likewise

wife conceited a thousand things of the like nature, which 'twould be too much trouble to relate here.

But all opinions of this kind have no manner of probability, for no bodies *Experience* did ever evince, that the *Metals* have any such correspondence with the *Planets*, as I have maintained elsewhere; much less can they prove that the *Influences* of the *Planets* do imprint such and such *Figures* to *Metals*, as these men do determine. It would be no hard matter for me here to shew how little reason or foundation there is in discourses of that nature, and how very weak and uncertain are the *Principles* of *Judicial Astrology*; but this would be too long a *Digression* for this place, and serve only to swell this Book with things that may be found treated of at large elsewhere, and particularly in the *Epitome* of *Gassendus* made by *Monsieur Bernier*.

My fancy therefore shall not soar so high as these mens do; and though I may seem dull and mean in their eyes, I shall not search in the *Cælestial Bodies* for an explication of the *Star* we now contend about; seeing that I can find it out in causes near at hand. There have been who gazing too earnestly upon the *Stars* above, have not perceived the *stone* at their feet, that causes them to *stumble*.

I say then that the *Star* which appears upon the *Martial Regulus* of *Antimony*, does proceed from the *Antimony* it self; for this Mineral runs all into *Needles*; but because before it is

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Purified, it is loaded with *sulphureous* and impure parts, which make it softish, these *Needles* do not appear but confusedly. Now when it is *Purified* with *Mars*, not only a great many of the more *sulphureous* parts of *Antimony*, and such as are fittest to hinder its *Crystallization*, are carried away, but also there remains the hardest and most compact part of the *Iron*, which makes the *Antimony* firmer than it was. So that the *Purification* does serve to lay open the Natural *Crystals* of *Antimony* in form of a *star*, and the *Iron* by its hardness does expatiate these *Crystals*, from whence it comes that the *Martial Regulus* of *Antimony* is harder than the other *Regulus*.

The *Crystals* then do appear in form of a *star* in the *Martial Regulus* of *Antimony*, because they were so *Naturally* in the *Antimony* before. This *star* does not appear exactly the same in the common *Regulus* of *Antimony*, let it be *Purified* never so much, because its parts have not the same tension as those of the other.

Add to pag. 116. lin. 28. in the

Remarks upon Crocus Metallorum.

The strong *Detonation* which happens when the matter is fired, is not caused from the accension of *Salt-peter*, as people generally do imagine, for want of due reflection. I shall prove in its proper place that it can't *flame* at all, and that by its *Volatile* parts it serves instead of a *Bellows* or *Vehicle* to rarifie and exalt the *sulphurs* of *Antimony*.

A

A *Liver of Antimony* is prepared with equal quantities of *Antimony*, *Niter*, and *Sea-salt decre-pitated*; and because these salts do give it a *Red* colour like unto the *Opale*, this Preparation has been called *Magnesia Opalina*; it is less *Emetick* than the other, by reason of the addition of *sea-salt*, which fixes the *saline sulphur* of *antimony*.

Several other ways of preparing the *Liver of antimony* have been invented; but I am well enough satisfied in having given you the best of all, and the easiest to prepare.

If you use ordinary *salt-peter* in this Operation, you'll obtain eight ounces and two drachms of *Liver of antimony*; but if you use *Purified salt-peter*, you'll get but six ounces and a half.

This difference of quantity proceeds from the nature of *salt-peter*, for the more *Volatile* parts this *Mineral salt* contains, the more apt it is to carry off some parts of the *antimony*. Now *Purified salt-peter* is much more *Volatile* than the common sort, wherefore the *Liver of antimony*, where it is used, is in lesser quantity.

The *Liver of antimony* that's made with common *salt-peter* is the *Redder*, and comes nearer to the colour of an *Animals Liver*, than that which is made with *Purified salt-peter*; this happens through the *fixt-salt* which is in this Preparation more than in the other; for common *salt-peter* contains much *fixt salt*, as I shall shew in its proper place; this *salt* does likewise make the matter the heavier.

As for the virtues of these *Livers of antimony*, the difference is not very great, but only that which is made with *Purified salt-peter* is a little more *Emetick* than the other. I

I cannot pass by here the false imagination of some men, who think that Preparation of the *Liver of antimony*, of which half a drachm, or two scruples may be given, is much better than that whereof 3 or 4 grains perform the same effect; for there's no doubt but the taking so great a quantity of *antimony* will give an impression to the *stomach*, that a lesser quantity is not able to do. Furthermore, seeing these Preparations do commonly open the *antimony* but little, or half fix the *saline sulphurs*, it is to be feared lest some *salt* they may meet with in the *Stomach*, should open them too much, or *Volatilize* them, and so produce unhappy consequences.

Add to pag. 141, Chap. II.

Of Quick-lime.

When the *stone*, that *Quick-lime* is made of, is grown red hot in the *Furnaces*, the *Workmen* have a special care to keep up the fire at an equal height, until the *stone* is quite *Calcin'd*; for if the flame which has begun to burn among the *stones*, should be suffered to lessen for a while, and so the heat be check'd before the end of the work, they would never afterwards be able to make *Quick-lime* with those *stones* any more, though they should be at the charge of burning fifty times as much *Wood* as is commonly required; and this, because in that interval of heat the *Pores* of the *stone*, which were begun to be

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opened,

opened, do close and shut, and the matter sinks down in a lump to the destruction of the whole. And then again the *Flame* can't rise in it any more, for it finds none of those *interstices*, or spaces between, which were frequent before, for it to pass through. The matter therefore is rendered incapable of receiving the fire any more, because all the small cells that were useful for it, are shut up and destroyed in this confusion.

'Tis Objected, that if *igneous bodies* were they that caused the *Corrosion* of *Quick-lime*, *Tiles*, *Bricks*, and all *Stones* that are not of the nature of *Lime-stone*, and *Iron*, *Copper*, *Silver*, *Gold*, and many other bodies should be as *Caustick* as *Quick-lime*, after having endured the fire as long if not longer than it.

But this does not follow, for *Tiles*, and other *Calcined stones* have not the *Pores* disposed like those of *Quick-lime*, to retain fiery particles; and if some *metals* are found to impregnate with them during their *Calcination*, they are known to retain them so well by the solidity of their parts, that neither the heat nor moisture of the fire are able to draw them out of the places they are fixt in, to cause a *Corrosion* upon the part. It is easie here to give you an example; for if you take the *Calx* of *Lead* that encreased its weight in the *Calcination*, as I have said before, and steep it in *water*, the *water* will not act at all upon it, and the *Calx* may be taken from the *water* in the same weight it was put in; you must melt it by fire, if you would separate the *igneous bodies*: but now as for common
Quick-

Quick-lime, a small matter of moisture is able to separate the tender parts of the *stone*, and drive out the fiery particles in abundance.

'Tis said likewise that the boiling of the water which happens when flung upon *quick-lime*, must not be imputed to fiery bodies, seeing neither *Spirit of Wine*, nor *Oyl*, when thrown upon it, do heat or his as all, although they are both of them *Inflammable* bodies, nay on the contrary they are observed to quench the heat that uses to happen to *quick lime* when water comes to it.

I Answer that these effects do proceed from this, that *Oyl*, *Spirit of wine*, and other *Salutiferous* liquors of the same nature, instead of separating the parts of *quick lime*, as *water* does, do rather hinder any separation from being made, by stopping up the Pores.

That which withdrew me from the Sentiment of those who will have all the effects of *quick-lime* derived from its *sale*, was, that I could never find any of it, though I sought after it with care enough, for some through a mistake mistake a certain *Bismuthine* *stone*, which often swims upon the *Lime-water*, for a *Salt*.

Neither can I be of the opinion of those who will needs have an *Acid* to be in *quick-lime*, which being drawn out by the water, and meeting an *Alkali*, does cause the *Effervescence* which is observed, when *water* is poured upon *quick lime*; for although according to appearance an *acid* does enter into the Natural composition of the *stone* that *quick-lime* is made of, this *acid* has lost its nature, not only by breaking its power

in its strict union with earth at the *Petrification*, but also in the violent *Calcination* that is given to this *stone* to reduce it to a *Calx*. So that we may here say, the same thing happens to the *acid* which enters into the composition of the *stone*, as I have said did happen to the *salt of Vegetables* and other mixt bodies, which though naturally an *acid salt*, changes into an *alkali* by means of its union with earth; and the fiery particles in time of the *Calcination*; there is only this difference between them both, the *acid* of the *stone* is mixed with more *earth* than the *salt of Vegetables*.

Add to page 152. chap. 13.

Of the stone *Hæmatites*.

The stone *Hæmatites* is called the *Blond stone*, either from its stopping *blond*, or from its red colour. It is commonly found in *iron Mines*, and it contains something of that *metal*; the best is that which is clearest, and has blackish raies. It is prepared by grinding it on a *marble* with a little *Plantain water*; it is *Defecative*, and *astringent*; it is used for *spitting of blond*, and other *Hæmorrhagies*; the dose is from fifteen grains to two scruples; it is also used outwardly in *Unguents*. A little *acid spirit* that partakes of the nature of *Iron* may be drawn from this *stone*, by *distilling* it like *Virriol* in a *Retort*; this *spirit* is a very good *Aperitive* for all *Obstructions*, the dose is to an agreeable acidity.

Sub-

Sublimation of the stone Hamatites.

Powder and mix together equal quantities of the stone *Hamatites* and *sal Armoniack*, put this mixture into an Earthen *Cucurbite*, or glass one luted at bottom, set a *Head* upon it, and fitting to it a small *Receiver*, and Luting well the Junc-tures, place it in a *Furnace*, over a very small fire at first, to warm the vessel, then encrease your fire by little and little, until it is very strong, continue it in this condition for some hours, or until the heat of the head lessens, then let the vessels cool, and unlute them; you'll find in the head, and at top of the *Cucurbite*, *Yellow Flowers* drawing towards *Red*, and in the *Re-ciever* a *Volatile*, *Urinous*, *Yellowish spirit*; keep the *spirit*, and the *Flowers* apart in bottles well stoppt. They are both of them very good to procure *Sweat*, and to open *Obstructions*: they may be used in *Malignant Feavers*, *Apoplexies*, *Palsies*, and in the *Scurvy*, in *Bolus*, or in proper liquors; the dose of the *Flowers* is from six grains to four and twenty, and of the *Vola-tile spirit*, from twelve drops to two scruples.

In the bottom of the *Cucurbite* is found a mass that may be distilled in a *Retort* with a gradual fire encreased to the highest degree of all, in a *Reverberatory Furnace*, there will come forth an acid spirit of much the same virtues as the fixt spirit of *Sal Armoniack*, of which I shall speak hereafter.

Remarks.

Sal Armeniack is here mixt that the *Volatile* parts may carry off the more soluble portion of the *Stone Hematites*; for it would never be able to sublime, if it were not driven by some such like Vehicle. This salt being also incorporated with it serves very much to give it the *sudorific* quality, by reason of its *Volatility*.

The *Cucurbits* is set in an open fire, that it may be heated the more, and the *Flowers* be the more tinctur'd; for the more heat there is, the *sal armeniack* does the more easily sublime the parts of the *stone*; the *Volatile spirit* is only some portion of the *Flowers* drawn into liquor.

The mass that remains in the *Cucurbits* is a mixture of the more fixt part of the *stone*, and *sal armeniack*.

All that is drawn from the *stone Hematites* is accounted of some use, and chiefly so by reason of the *Iron* it contains.

Many other *Preparations* of this *stone* have been invented, but these are the best, and choicest.

Add to pag. 154.

Remarks upon the Oyl of Bricks.

The ancient *Chymists* called this Oyl, the Oyl of *Philosophers*, and have given the Epithete *Philosophical* to all Preparations that are made with *Bricks*. The reason that can be given for it is, that

that because they call themselves the only *True Philosophers*, or *Philosophers* by way of excellence, they thought they were obliged to confer some influences of this mighty name upon *Bricks*, because they are the *materials* wherewith they build their *Furnaces*, to work at the *High and mighty Operation*, or the *Philosophers stone*; for they pretend it is by this *Operation* alone that *True Philosophy* can be obtained.

Add to pag. 165. chap. 14.

Of Common Salt.

Sea-salt is made at *Rochell* in *salt marshes*, which are places that must be of a lower situation than the *sea*, and the ground must be *Clayie*, for otherwise they would not be able to retain the *salt-water* that has been let into them. Thus all places near the *sea* are not alike proper to make *salt marshes*.

When the Season of the year begins to grow hot, which commonly happens in *May*, all the water is emptied that was put into the *marshes* for better preserving them during the Winter, then the *sluces* are opened to let in as much *salt-water* as they think fit, 'tis made to pass through a great many *Channels*, wherein it purifies and heats, and then is let into places that are made flat, smooth and fix to *Crystallize* the salt.

This salt is made only during the great heats of Summer, the *Sun* does in the first place evaporate some part of the *Water*, and because after the great

heat, a small *Wind* does use to blow (as is usual near the *sea*) the coolness of this *Wind* does condense and *Crystallize* the *salt*.

But if it happens to *rain* but two hours during the hot weather, there can no *salt* be made for a fortnight afterwards, because the *marshes* must be again emptied of all the *water*, to let in more in its place, so that if it chances to *rain* but once again in the next fortnight, they can make no *salt*.

Besides the *Purification* of *salt* by *evaporation*, it may be further *purified*, if instead of *Evaporation* of the humidity, you set some of it a *Crystallizing* in a cool place, for very fine pure *salt* is found at bottom of the vessel, which *salt* may be separated from the water, and dried, you may then evaporate again some part of the *salt* liquor, and set it in a Celler a *Crystallizing*, and so continue your *Evaporations* and *Crystallizations*, but at last you must be fain to evaporate the liquor to the consumption of all the humidity, because at last it will *Crystallize* no longer, the reason whereof is, that the remaining *salt* is full of a fat bituminous matter, which is in a manner inseparable from it, and this 'tis that hinders the *Crystallizing* at last.

'Tis probable that this fat matter comes from the earth of those *marshes* that were spoken of.

The first *Crystallized salt* being put into *Oyl* of *Tartar*, or some other *Alkali salt* dissolved, does mix with it without making any *Ebullition*, because although *sea-salt* is *Acid*, yet its points are too gross, and have too little motion, to separate the parts of the *Alkali*.

The

The last salt being dried over the fire, and mixed with some *Alkali salt rendered liquid*, such as *Oyl of Tartar*, makes a *Coagulation* and *Precipitation* of a substance that appears *saline* and *Oily*; this *Coagulation* does proceed from the mixture and adhesion of *Bituminous earth* with *sea-salt* and *Tartar*; for these salts do easily embrace *Oily* substances, and in them lose their activity.

Many *Acid Bituminous salts* which are drawn by the *Evaporation* of certain *Mineral waters*, such as those of *Baleruc* in *Languedoc*, and *Digne* in *Provence*, do perform the same effects, when they are mixed with *Oyl of Tartar*.

This *Coagulum* does not dissolve in water, as well by reason of the different nature of the salts it is compounded of, as the *Oily earth* that holds them together; but it will dissolve in *distilled Vinegar*, and several other *Acid liquors*, and then an *Effervescency* rises, because the *Acid* does penetrate the *salt of Tartar*, whose parts *sea-salt* had no power to separate.

Add to pag. 169. lin. 30.

Remarks upon Spirit of Salt.

Since I writ of *Monsieur Seignett's* particular way of drawing *spirit of salt*, some have Printed, that if common salt well *decrepitated*, and kept a good while over the fire, were exposed to the *Air* for some daies, and *distilled* without addition of any thing to it, it would yield a *spirit* much

much like that I have spoken of, and in full as great a quantity.

But if we examine the sharp liquor which is drawn this way, we shall find it of so weak a nature, that it may more reasonably be called *Phlegm*, than *spirit*, and the *salt* remains entire in the *Retort*; whereas *M. Seignett's spirit of salt* is full as strong as common *spirit of salt*, &c. has the very same qualities, nay I conceive it somewhat better, as not having so great an *Impression* from *fire* as the other.

Again some say, it does not deserve the name of *spirit of sea-salt*, nor ought this *Preparation* to be look'd upon as any great *mystery*, because the same incorporation and augmentation happens to divers other *salts* exposed to the *Air*, after drawing off their *spirit*.

I grant this *augmentation* proceeds from the *spirit* of the *air*, and I conceive it is the same *spirit* which produces all manner of things according to the *Matrixes* or different pores of the earth it uses to meet with, as I have explicated in my *Remarks* upon the *Principles*. But because this *spirit* of the *air* has met with *Pores* in our matter, ready disposed to make a *salt* much like unto common *salt*, and a *spirit* is drawn from it much like unto that which is drawn from common *salt*, I see no reason to doubt why this *spirit* should not be a true *spirit of salt*, all the difference is this, the *salt* I now speak of is not so thoroughly mixed to its earthy part, as common *salt* is, and therefore its *spirits* do separate with more ease; for they are drawn without *Addition* of any thing else, and with a gentle fire,

fire, whereas those of common *salt* are so fix, that they can't be driven out, without mixing a great deal of *earth* in order to separate all its parts, and without a very great fire.

As for the *Augmentation* which happens to many other bodies exposed to the Air, after their *spirits* are drawn off, I don't question the matter of fact, nor that these same substances do return into what they were before, by impregnating again with *spirits* of the Air in considerable time; but it is rarely found that any of them do yield as strong *spirits*, and as easily as our *salt*, and herein lies the *mystery*.

Add to pag. 170. lin. 12. in the same

Remarks.

Some have written, that the *Precipitation*, which is made by *spirits* of *salt*, of any matter held up by *Aqua fortis*, must not be imputed to the gravity, nor force of *spirit* of *salt*, nor to any conflict or jogg that this *spirit* gives to *Aqua fortis*, or the matters dissolved; but rather to the conjunction of the *Acidity* of this *spirit* with the *Volatile* and *Sulphureous Alkali* of *Aqua fortis*, or *spirit* of *Niter*, which *Acid* hereby forces this last to abandon the metal it had dissolved.

But this is the same as so explicit an *obscure* matter by another more *obscure*; for what likelihood is there that the *Volatile spirit* of *Aqua fortis* is an *alkali*? and how comes it to continue in so great a motion with the fix *Acid spirit* of
this

this *water* without being destroyed? this can't easily be understood. Again, suppose this *Spirit* were an *alkali*, we must come to explicate mechanically, by what reason this *Alkali* does leave the body of the *metal* to betake it self unto the *spirit of salt*; for to say simply that by the conjunction of these two *spirits*, the *Aqua fortis* is compelled to abandon the *metal* it held dissolved, does give no light at all to the question, unless we had power enough to bestow intelligence upon these *Spirits*; wherefore we must needs at last have recourse to jogs and conflicts.

Add to pag. 171. lin. 16. Chap. 15.

Of Niter or Salt-peter.

The great and violent flame which happens as soon as *Salt-peter* is flung upon the *Coals*, and the red vapours which it uses to yield when reduced into a *spirit*, have induced the *Chymists* generally to believe that this *salt* is inflammable, and consequently full loaded with *Sulphur*, because *sulphur* is the only Principle that flames; but if they had suspended their judgments herein, until they had got more experience on this Subject, they would not only have known that *Salt-peter* is not at all Inflammable by nature, but they would e'en have doubted whether or no any *sulphur* does enter into the natural composition of this *salt*; for if *Salt-peter* were Inflammable of it self like *sulphur*, it would burn in places where there is no *sulphur*, for example in a *Crucible*

ble heated red-hot in the fire, but it will never flame therein, use what quantity of it you please, and let the fire be never so great. It is true indeed; if you throw *Salt-peter* upon kindled coals, it makes a great flame, but this is only through the *Sulphureous Fuliginosities* of the coals, which are violently raised and rarified by the *Volatile* nature of *Niter*, as I shall prove in the Operation upon fixt *Niter*.

As for any *sulphur* that is thought to be contained in *Salt-peter*, it can't be demonstrated by any Operation whatever, for the red vapours that come from it are no more *Inflammable* than the *Niter*, when they are not mixt with some *Sulphureous* matter; and it is far more probable, that this salt contains no *Sulphur*, if we consider its cleanness, transparency, acidity, and cooling quality, which have no manner of affinity with the effects of *Sulphur*, which are commonly to make a body opaque, to joyn with its acidity, and to heat it.

Add to pag. 177. l. 26.

Remarks upon *Sal Polychrestum*
Sal Polychrestum must by no means be used until it is made very white, and very pure, for when there remains any gross portion of *Sulphur*, *Vertigoes* are to be feared, and stragglings on of the *Nerves*, and nausea of the stomach.

If you used sixteen ounces of purified *Salt-peter*, and so much *sulphur* in this Operation, you'll have at last but three ounces and a half of *Sal Polychrestum* very fine; but if you use common *Salt-peter* instead of purified, you'll have five ounces of *Polychrestum* as white as the other. This difference of weight proceeds from common *Salt-peters* containing more fixed salt than purified *salt-peter*.

Sal Polychrestum may be Crystallized like *salt-peter* and other salts. Its Crystals are very small, and much like those of sea-salt; but only they are keener.

Add to pag. 179.

Remarks on Salt of Sulphur.

Some have presumed to write, that when spirit of sulphur is poured upon *Sal Polychrestum* dissolved in Water, there rises an Effervescency as great as when the same Acid Spirit is cast upon *salt-peter*; but doubtless they took but little care in what they maintained, for there happens no manner of Effervescency, neither with *Sal polychrestum*, nor with *salt-peter*, for both of them are Acid salts. Nor do I see any reason to believe, that if the mixture of *salt-peter* and Spirit of Sulphur is drawn in a Retort, the Spirit of Niter will come forth and leave the Spirit of Sulphur in union with the fixed part of *salt-peter*; for although red vapours are seen to come forth of the Retort, this does not prove that

that they are purely Nitrous, those of the Spirit of Sulphur are mixt with them; but they are hid in the redness like Water in Wine.

Add to pag. 182. after Spirit of Niter.

Spirit of Niter Doubled.

Put into a large Bontthead eight ounces of good spirit of Niter, and so much spirit of Wine well dephlegmated; set your Bontthead in the Chimney upon a Round of Straw, the liquor will grow hot without coming near the fire, and half-an-hour or an hour afterwards, it will boil very much; have care of the red vapours that come out a peece at the neck of the Bontthead, and when the Ebullition is over, you'll find your liquor clear at bottom, and to have lost half what it was; pour it into a Vial and keep it, this is the sweet spirit of Niter.

It is good for the Wind Cholick and the Nephritic, for Hyperical distempers, and for all Obstructions; its Dose is from four to eight drops in Broth or some other convenient liquor.

Remarks,

You must leave the Bontthead open; for the Vapours would either carry away the Stopple, if there were one; or else they would break the vessel; the Bontthead is so hot during the Ebullition, that one can't endure ones hand upon't.

The *Heat* and *Ebullition* begin sooner or later, according as the *Spirits* that are used have been more or less *dephlegmated*.

This *Effect* is very strange; for *spirit of Niter* being a strong *Acid*, and *Spirit of Wine* a *sulphur*, it can't be said that there's here any *alkali*, to cause the *Ebullition* with *Acid*, according to the common maxime. And this *Operation* shews us that every thing can't be explicated by the sole *Principles* of *Acid* and *alkali*, as some do pretend.

This *Operation* has much resemblance with that which happens when *Oyl of Turpentine* is put into a bottle with *Oyl of Vitriol*; for the mixture of these liquors does *heat* and *boil* much alike. I shall say something of this last mixture hereafter. There is this difference notwithstanding, that *Spirit of Niter* being more *Kalatile* than *Oyl of Vitriol*, causes a greater *Effervescency*.

In order therefore to explicate this *Ebullition*, two things must be considered. First, that *spirit of Niter* contains a great many fiery parts lock't up in its *Acidity*, but which still retain some motion, for 'tis they that make *spirit of Niter* to *Fume* as it does.

The second is, that *spirit of Niter* is more *Inflammable* than *salt-peter*, when mixed with any *sulphureous* body, and the reason thereof is, that it is more *rarified* than *salt-peter*.

Thus when this *Acid Spirit* is mixt with *Spirit of Wine*, which is a *sulphur* very much *exalted*, and very *susceptible* of *motion*, the *Volatile* part

of the *spirit of Niter* joyns its self to this *sulphur*, and the mixture becomes ready to take *flame*; likewise after this mixture the fiery bodies that were in *Spirit of Niter*, do by striving to mount upwards put the liquor into so great a motion, that it e'en almost *flames*, and would without all question quite *flame*, if there were not some *Phlegm* always mixed with these *spirits*, let 'em be drawn never so pure, which serves to allay the activity of the fiery particles, so that there must needs follow a very great *Ebullition*.

This *Effervescency* therefore proceeds from this, that *spirit of wine*, and *spirit of Niter*, which are as it were a *salt-peter*, and highly exalted *sulphur*, have been almost kindled into a *flame* by the fiery bodies that were in *spirit of Niter*; and that which further proves this conception is, a noise or kind of *Detonation*, during the *Effervescency*, which is much like that which happens, when *sulphur* and *salt-peter* are burnt together.

The great *diminution* of the liquor proceeds from the *Evaporation* of the more *Volatile* parts of the *Spirits of wine* and *Niter*, through the neck of the *Boulthead* during the *Ebullition*.

That which remains is a well *sweetned spirit of Niter*, for not only its points are soundly blunted in the *Ebullition*, but the *spirit of wine* being a *sulphur* unites and imbodyes with those that remain, so that they have no longer any *Corrosive* quality.

Add to pag. 182.

Remarks, upon Aqua Fortis.

The mixture of *Vitriol* and *salt-peter* has quickly some smell of *Aqua fortis*, because *Vitriol* contains a great deal of *sulphur*, which easily insinuates into the *Volatile* part of *salt-peter*, and exalts some little of it, which causes the smell; it is this *sulphur* in *Vitriol* which by volatilizing the *Red Spirit of Niter*, makes it come forth faster, and with a less fire, than when *salt-peter* is distilled with *Clay*.

Add to pag. 184.

Remarks upon the Fixation of Salt-peter into an Alkali Salt.

The *Crucible* must be but half full of *salt-peter*, because the *Detonation* is so great, that the matter would be driven out of the *Crucible*, if too much be put in. When the *Crucible* is not very strong, it breaks in pieces about the middle of the Operation, and some part of the matter is lost by it.

This *Detonation* is more violent than that which is made with a mixture of *salt-peter* and common *sulphur*, because the *sulphur* of *Coals* is more *Rarified* than common *sulphur*.

Niter will never be able to flame, when set over the fire alone in a *Crucible*, though you make your fire never so strong, and *coals* though loaded

loaded with *fuliginous* or *Oily* parts, do send forth but only a *small blew flame*; but when these two bodies come to be mixt together, the *Volatile* parts of *Niter* joyning with the *Coals*, which are *Oily*, do rarify and exalt the *Coals* with such a violence, that they produce a very great flame. Now this Operation confirms my Opinion that *salt-peter* does only serve here to *Rarifie* the flame of *sulphur*, but cannot send forth the least flame of its self; seeing that as soon as ever the *coals*, you put into the *Crucible*, are *burnt*, the flame goes out, and appears no more until you throw in more *Coals*, with which a convenient proportion of the *Volatile* parts of *salt-peter*, that still remained, does joyn, and *Rarifie* them into a flame. Thus new *Coals* are successively thrown into the *Crucible*, until it flames no longer; but toward the end of the Operation, because there remain but few *Volatile* parts of *Niter*, the *Detonation* is much the less, and so is the flame, until at last the *Coals* finding nothing more in *salt-peter* for it to raise, do burn only just as they use to do all alone.

If you make use of common *salt-peter* for this Operation, you'll have occasion to use but three ounces and a half of *Coals*, and you'll get twelve ounces of *Purified salt*, but if you use *fine salt-peter*, you must spend seven ounces of *Coals*, and will get but three ounces of *purified salt*.

This difference of weight proceeds from the *fine salt-peters* containing more *Volatile* parts than the other; likewise a great deal more *Coals* is required to raise them, and there remains the less *fixed salt* for the same reason.

The *fixt Niter* being prepared as I have shew-
ed, it is a little grey colour'd; now to make it
white you must *Calcine* it in a great fire, stirring
it in the *Crucible* all the while with a *spatule*;
when it shall have continued *Red-hot* for above an
hour, it will become exceeding *white*. You must
then *dissolve* it in water, *filter* the dissolution,
and *evaporate* the water, and thus you have a
very pure and *white salt*.

This *salt* is an *Alkali*, being a mixture of the
salt of Coals, which is an *Alkali*, and *fixt salt-*
peter; these two *salts* are so strictly united and
mixed together in the *Calcination*, that they make
a *Porous salt*, and such as is much like unto the
fixt salt of Plants.

Not that there is an *Alkali salt* in *salt-peter*,
as *Chymists* will have it; for give what *Calcina-*
tion, or other *Preparation* you please to this
Mineral salt, without adding any thing to it,
nor the least *Alkali* can be drawn from it, and all
that ever we can see in it is *Acid*.

It is further *Observable*, that the *liquor* of
fixt Niter, which has been made with common
salt-peter, being kept a year, or a year and a
half, loses most of its activity as an *Alkali*, so
that it is no longer able to cause any such *Ebulli-*
tion with *Acids*, as it could before it was so
fale.

This accident can have no other cause, than that
the *Pores* of *salt* contained in the *liquor* do close
up by little and little, and the *Acid salt of Ni-*
ter does absorb and destroy the *Alkali*, which
kept the *Pores* open.

But

But the same thing does not happen, where the liquor of fixt Niter was made with Purified salt-peter, because whereas a great deal of Coals was used in the fixing it, and but little salt of Niter remained in it, the Alkali must there predominate so powerfully, that the Acid is not able to regain its strength.

This Experiment seems plainly to demonstrate, that fixt Niter is only an Acid salt rendred Porous by the Alkali of Coals.

Some Chymists have thought fit to call the liquor of fixt Niter, Alkabeft, that is, an Universal dissolvent, thinking it is capable to draw out the sulphureous substance of all mixt bodies.

Add to pag. 185. Chap. 16.

Of Sal Armoniack.

The Artificial sal Armoniack is made at Venice, and divers other places with five parts of Urine, one part of sea-salt, and half a part of Chimney soot; these three are boiled together, and reduced into a Mass, which being put into subliming Pots, over a gradual fire, it sublimes into a salt in the form we commonly see sal Armoniack. Now in this sublimation the Volatile Alkali salts of Soot and Urine do carry up as much sea-salt as they are able, and do joyn so strictly together with this Acid salt, that the mixture seems to be fixt. The reason of this close union is, that sea-salt being in form of points, does insinuate into the Alkali salts; and

because it has not motion enough to separate the parts of these salts; it gets within 'em, and fills their Pores.

Add to pag. 190. the end of the

Remarks upon *Aqua Regalis*.

It is *Objected*, that if there is any heavy matter as it were intercepted between the Pores of Gold, it must needs *Precipitate* of its self, after the action of *Aqua Regalis* upon this metal, which is a thing that does not happen.

I *Answer* that if the parts of Gold are heavy, the *Dissolvent* is a gross body, and very well proportioned to hold up those heavy parts, and hinder them from *Precipitating*.

Others have *opposed* this *Explication*, and have writ, that if *Aqua Regalis* dissolves Gold, and can't dissolve *Silver*, the reason of it is, that the gross points of *Spirit of Niter*, or *Aqua fortis* are subtilized by the mixture of *sal Armoniack*, and are rendered fit to enter into the small pores of Gold, whereas the delicate *Fabrick* of these same points does not leave the necessary force nor motion to divide the parts of *Silver*, whose pores are a great deal bigger.

But this way of arguing does not agree with *Experience*: for what likelihood is there that the points of *Spirit of Niter* are so subtilized by the penetration and division of the parts of *sal Armoniack*? or where shall we find any *Example*, that after a considerable *Effervescency* of

two salts met together in conflict, the *Acidity* grows sharper than it was before? this is a thing that can never be proved. On the contrary, every body knows well enough that no *Effervescency* happens but the *acid* is partly blunted or broken thereby. Moreover the Argument supposes that *spirit of Niter* does break its subtlest points in violently contending with the *sal Armoniack*, whereas in *sal armoniack* there are *Alkali salts* whose property it is to destroy *acids*. I could further add here, that the conjunction of salt with *spirit of Niter* should of necessity render its points more gross than they were, and that the *Crystals* which are drawn by the use of *aqua Regalis* have their shape not so sharp as those that are drawn by *aqua Fortis*. But that which I have said is so probable in its self, and so easie to be convinced of, if one takes never so little pains to consider it, that I should but amuse the Reader to little purpose, if I should offer to give any more proofs of it.

Neither do I find it convenient to make a long discourse in Explicating how *Silver*, which has lesser Pores, is more susceptible of the impressions of Air and Fire, than *Gold* which has larger, seeing I have already supposed that the matter intercepted between the Pores of *Gold* is more compact, and consequently more hard to separate than that of *Silver*.

Add to pag. 194.

Remarks upon another Preparation of the Volatile spirit of Sal Armoniack, together with its Flowers, and Fixt Salt against Feavers.

You see by this Operation that eight ounces of *Sal armoniack* do contain at least four ounces and a half of *Volatile salt*.

The *Volatile Spirit* of *Sal armoniack* is only a dissolution of *Volatile salt* in *water*, and if there is not *Phlegm* sufficient to dissolve all the *Volatile salt*, there remains some part of it at bottom of the *Receiver*, and that may likewise be turn'd into *Spirit*, by only adding enough *water* to dissolve it. Thus the *Spirit* becomes as strong as it can be made, for the *Pores* of the *water* being filled with as much *salt* as they can contain, it can receive no more. But if there happens more *water* than the proportion of *Volatile salt* requires, then the *Spirit* proves weak, and must be given in a larger Dose.

This *Spirit* is *Sudorifick*, but you may perceive more sensibly the effect of *Sal armoniack* to cause *Sweat*, by dissolving six or eight grains of this *Salt*, and the same quantity of *Salt of Tartar*, each separately in two small Doses of some proper liquor, and giving them to a Patient one presently after the other; for the *salt of Tartar* working upon the *Sal armoniack* in the stomach,

mach, after the same manner as it does when they are mixt together in a *Mortar*, the *Spirits* do separate from the latter with more force, and act more powerfully, than when they have been separated, before they were given, by a preceeding mixture; for the small violence that the *Volatile Spirits* do use in their separation from *sea-salt*, does leave them the more activity, and disposes them the better to pass through the *Pores*. Again, it is not incredible, that in the former Effort which these *Spirits* made in their separation from the *fixt* part, when *Sal armoniack* was mixt with *salt of Tartar* in a *Mortar*, the more *subtle* part flies away first, and is lost; now 'tis this *subtle* portion that is most proper to *Rarifie* the humours, and to drive them out by *Transpiration*.

If you mix in a *Vial* equal quantities of *Volatile spirit* of *Sal armoniack*, and *Spirit of Wine*, and shake them a little together, they'l cause a *Coagulum*.

This *Coagulation* proceeds from that the *Spirit of Wine*, which is a *Rarified Oyl*, does unite with the *Spirit of Sal armoniack* which is a *salt liquor*, and 'tis but the same thing as happens from stirring *Oyl* and some *salt liquor* in a *Mortar*, in order to make an *Unguent*, called *Nutritum*.

By this incorporation together, the *salt* is shut up in the ramous parts of the *sulphur*, and these same *sulphureous* parts are checkt, or as it were *fixed* by the *salt*, so that neither of them have any more freedom of motion; and from this repose of these parts results the *Coagulum*.

Add

Add to pag. 197. Chap.

Of Vitriol.

If you dissolve a little *white*, or *green Vitriol* in water, and write with the Dissolution, the writing will not be seen, but if you rub the Paper with a little Cotton dipt in the Decoction of *Galls*, it will appear legible; then if you wet a little more Cotton in *Spirit of Vitriol*, and pass it gently over the Paper, the Ink will disappear again; and yet at last if you rub the place with a little more Cotton dipt in *Oyl of Tartar* made *per Deliquium*, it will again appear legible, but of a *Yellowish* colour.

The reason that I can give for these Effects is this, the *Spirit of Vitriol* dissolves a certain *Coagulum* which is made of *Vitriol* and *Galls*, but the *Oyl of Tartar* breaking the force of this *Acid Spirit*, the *Coagulum* resumes it self, and appears again, but because it now contains *Oyl of Tartar* too, it acquires a new colour.

If you should throw the dissolution of *Vitriol*, or *Vitriol* only powder'd into a strong Decoction of dried *Roses*, it will turn as black as common Ink; if you pour some drops of *spirit of Vitriol* into it, this Ink will turn red; and if you add to it a little *Volatile spirit of Sal Armoniack*, 'twill turn gray.

These changes of colour do proceed from the *spirit of Vitriols* dissolving the *Coagulum* which the *Vitriol* it self had made, and rendring it.

invisible; the liquor recovers a fresher Red colour than it had, before the Vitriol was put into it, because the same Spirit does separate the parts of the Rose which were dissolved in the liquor, and renders them more Visible.

The Volatile spirit of Sal Armoniack, which is an Alkali, does partly break the Acid edges of the spirit of Vitriol, so that the parts of the Rose having nothing more to hold them Rarified, do close together, and consequently the liquor changes colour.

By this Experiment may be seen, that the dried Rose may serve to make Ink with, as well as Galls, Indian Wood, and divers other things will do the same.

Add to pag. 199. the end of the

Remarks upon Calcination of Vitriol.

If one should resolve to dry as exactly as one can, sixteen pounds of green Vitriol, there would remain but seven pounds of white Vitriol.

But in order to do this exactly, you must powder the white Mass of Calcined Vitriol, after you have broke the Pot, and stir it for a long time in an Earthen Pan, over a little fire, until there rises no more Fume from it; or until there remains in it no more Phlegm.

If you should Calcine this white Vitriol to a Redness, you'd have five pounds and a half of Chelcothar.

Some

Some have affirmed in writing that the *Red colour* which appears after a long *Calcination* of *Englisch Vitriol*, was an undoubted proof that that there was *Copper* in it, after the same manner as the *Red colour* which happens to *Vendigraese calcined* is a certain proof that it contains in it some particles of *Copper*.

But that which is here said to pass for a thing undeniable, is no proof at all; for first of all those *Vitriols* which are thought most to partake of *Copper*, do give no greater *Redness* in their *Calcination*, than the others which partake least of it. Secondly let *Copper* be Prepared which way you please, you can never make it *Redder* than the *Cholcothar* of *Englisch Vitriol*, whose *Redness* must be thought to proceed from some particles of this *Metal* contained in it. And thirdly, we see plainly, that *Iron*, *Lead*, *Mercury*, and divers *Mineral* bodies do acquire a *Red colour* in their *Calcining*, without granting they contain any *Copper*.

Add to pag. 201. the bottom of the Page,

Remarks upon Spirit of Vitriol.

If you Distil eight pounds of *white Vitriol*, that sixteen ounces to the pound, you'll draw off seventeen ounces of *Phlegm*, and two and twenty ounces and a half, both of the *Sulphureous*, and the *Acid spirit of Vitriol*. Of these two and twenty ounces and a half, there will be five ounces of *Sulphureous spirit*.

You'l

You'll find in the *Retort* five pounds, five ounces of *Chalcothar*.

Use all the care you can possible to preserve all the liquors which come from *Vitriol*, and yet it will be impossible for you to hinder it from losing some through the *functures*, during the *Distillation*.

If you should use *German* instead of *English Vitriol*, you'd draw off a little more *spirit* than the quantity I named, but it would have some smell of *Aqua Fortis*, and the matter which remains in the *Retort* would be of a brown colour drawing towards black. This Colour proceeds from *sulphureous Fuliginosities* which rise more from this *Vitriol* than the other, because it partakes of *Copper*; for this Sooty vapour finding no vent to get out at, falls down again upon the matter and blackens it.

There's one thing happens about the *Oyl of Vitriol*, when 'tis very strong, which is very strange indeed; it is, that if you mix it with its *Acid Spirit*, or with *water*, or else with an *Ethereal Oyl*, such as the *Oyl of Turpentine*, this mixture grows hot to that degree, that sometimes it breaks the *Viol* 'twas put into, and often it produces a considerable *Ebullition*.

I should quickly give account of this heat and *Ebullition*, if I would suppose an *Alkali* in the *Oyl of Vitriol*, as those do who pretend to explicate every thing that happens by the notions of *Acid* and *Alkali*; but not comprehending how an *Alkali* should be able to remain so long a time with so strong an *Acid* as is the *Oyl of Vitriol*.

riol without being destroyed, I had rather give a reason that seems to me abundance more probable.

I conceive therefore that if *water*, or *Spirit of Vitriol*, or the *Ethereal Oyl of Turpentine* do heat the *Oyl of Vitriol*, it is by setting in motion a great many fiery particles which the *Oyl of Vitriol* had drawn with it in the *Distillation*; for these little fiery bodies being environ'd with *Salts* that are exceeding heavy, and hard to *Rarify*, they drive about vehemently whatsoever stands in their way, and when they have caused an *Ebullition*, and find they can't get out a-top of the *Viol*, they break it to pieces with the buffle they make at bottom, and on the sides.

Perhaps it will be said, I do here suppose *gratia* that the *Oyl of Vitriol* does contain fiery particles; but if we consider the great violence of fire, and the time that is spent in drawing this *Acid*, 'twill be no such hard matter to grant me this supposition. Besides it will be hard to explicate the great and burning *Corrosion* of *Oyl of Vitriol* without admitting these fiery parts, for the *Vitriol* contains nothing in it self of this *Causstick* nature; 'tis true indeed that it contains *Pblegm*, *Sulphur*, and *Earth*, but it is a thing impossible but this *Acid* should discover it self more than it does, if it were as *Corrosive* in the *Vitriol*, as it is in the *Oyl*.

Once it hapned to me, that putting into my *Furnace* a *Retort* whose two thirds were filled with *German Vitriol* dried, in order to draw off its *Spirits*, I *Distilled* first of all the *Pblegm*,
and

and *sulphureous spirit*, which I took out of the *Receiver*; I then fitted it again to the *Retort*; and by a great fire continued for three dayes and three nights, I distilled off the *Acid Spirit* as we are used to do. When the Vessels were grown cold, I admired to find in my *Receiver* nothing but a *Mass* of Salt, or *Congel'd Oyl of Vitriol*: This Salt was so exceeding *Causick* and burning, that if I offer'd to touch the smallest part of it with my finger, I presently felt an insufferable *scalding*, and was fain to put my hand immediately into *water*, it continued to fume still, and when a little of it was thrown into *water*, it made the same hissing noise, as a fire-coal put into *water* would do. Besides it heated the *water* very much, and much more than common *Oyl of Vitriol* could.

If you fill a *Glass Viol* with the *Decoction* of *Nephritick Wood* clarified, and observe it, turning toward the *Light*, it will appear *Yellow*; but if you turn your back to the *Light*, it will appear *Blew*; if you mix with it some dregs of *Spirit of Vitriol*, it will appear *Yellow* on every side, but if you again add about as much more *Oyl of Tartar*, it will return unto its first colour.

If you take a *Blew*, or *Violet tincture* made in *water*, such as is drawn out of the *Sun-Flower*, or *Violet Flowers*, and pour upon it some drops of *Spirit of Vitriol*, it will presently turn *Red*; but if you throw into it some *Alkali salt*, it will recover again its former colour.

On the contrary if you pour an *Alkali liquor*, such as *Volatile Spirit of Sal Armoniack*, upon the

the *Blue* tincture, it will presently turn *Green*; and if you again pour upon it a little *Spirit of Vitriol*, it will change this colour into an obscure *Red*.

The *Decoction of Indian Wood* is very *Red*: if you drop into it a little *Spirit of Vitriol* it will turn *Yellow*; and if you still add some *Volatile Spirit of Sal Armoniack*, it will become *black*.

All these changes of colour, which the *Spirit of Vitriol*, or other *Acids*, and *Alkali's* do make, proceed only from the different position of bodies dissolved in the liquor, and from its disposition to *modifie* the *Light* different wayes.

Add to pag. 208.

Remarks upon Distillation of *Alom*.

Some have written that *Alom* yields but very little *Acid*, yet if they'l but take the pains to keep up a strong fire under it for three dayes together, they'l find that this *Spirit* does not give place in strength, or quantity to that of *Vitriol*.

Nor are we at all obliged to distinguish, as they would have us, the *Acrimonious*, *Corrosive* salt of *Alom* from its *Acid*, seeing that there is nothing either *Acrimonious* or *Corrosive* in this *Mineral* salt, which will not turn into an *Acid Spirit*, when it is driven forcibly by fire.

Add

Add to pag. 211.

Remarks upon Flowers of Sulphur.

If you mix one part of *Sal Polychrestum* with two pounds of *Sulphur*, and sublime them together, as those I have described, you'll have white *Flowers of Sulphur*, which are thought to be better for distempers of the *Breast* than those others; they are given in the same Dose. This *Whiteness* proceeds from a very exact Attenuation which *Sal Polychrestum* gives to the *Sulphur*; the *Sal Polychrestum* which remains at bottom of the *Cucurbite*, may be Calined, and if you afterwards Purifie it by Dissolution, Evaporation, and Filtration, it will be full as good as before.

Add to pag. 216. Chap.

Of Amber.

Amber is to be found near the *Baltick-sea*, in the *Dutchy of Prussia*, and no where else.

Some do think *Petroleum* or *Oyl of Peter*, to be nothing but a liquor drawn from *Amber* by the means of *subterranean fires*, which make a distillation of it, and that *Jet* and *Coals* are the remainders of this distillation.

This Opinion would have some resemblance of truth, if the places where this *Oyl* is found were not so far distant the one from the other;

for *Petroleum* is usually found only in *Italy*, as in *Sicily*, and in *Provence*; this *Oyl* Distills through the clefts of rocks, and it is very probable to be the *Oyl* of some *Bituminous* matter, which the *subterranean fires* had raised.

Tincture of Amber.

Take powder finely five or six ounces of *Yellow Amber*, and put it into a *Boule-head*, pour upon it spirit of *Wine* four fingers height, stop this *Boule-head* with another to make a *Circulatory* vessel, and luting exactly the *Juncture* with a wet Bladder, set it in *Digestion* in warm *Sand*, and leave it so for five or six daies, or until the *Spirit of Wine* is well impregnated with an *Amber* colour; pour off this *Tincture* by *inclination*, and add more *Spirit of Wine* to the remaining matter, you must digest it as before, afterwards separating the *impregnation*, mix it with the other, filter them, and then distil in a *Limbeck* with a small fire, about half the *Spirit of Wine*, which may serve for the same use as before; keep the *Tincture* that you find at bottom of the *Limbeck*, in a *Vial* well stopt.

It is good for the *Apoplexy*, *Pulse*, *Epilepsie*, and *Hysterick* distempers; the *Dose* is from Ten drops to a drachm in some proper liquor.

Remarks.

You must powder the *Amber* very finely, that the *Menstruum* may open it the more easily; this *Tincture* is only the *sulphureous* or *Oily* part of *Amber*, with which the *Spirit of Wine*, which

is a *sulphur*, is impregnated; some other liquor that is not *sulphureous* would perhaps be able to dissolve the *Amber*, but then that which it did dissolve would be but *impure*. And for this reason you must alwayes use a *dissolvent* that is of the same nature with the substance you desire to dissolve.

The Volatile Salt of Amber.

Put two pounds of *Amber* powdered, into a large glass or earthen *Cucurbite*, let it be filled but the fourth part full, set this *Cucurbite* in *Sand*, and after you have fitted a *head* to it, and a small *Receiver*, lute well the *junctures*, and light a little fire under it for about an hour; then when the *Cucurbite* is grown warm, encrease it by little and little to the third degree; and there will distil first of all a *Phlegm* and *Spirit*, then the *Volatile Salt* will rise, and stick to the head in little *Crystals*; afterwards there distils an *Oyl* first *white* and then *red*, but clear: when you see the *Vapours* rise no longer, you must put out the fire, and when the Vessels are cold unloose them. Gather the *Volatile Salt* with a Feather, and because it will be but *impure* as yet, by reason of a little *Oyl* that's mixed with it, you must put it into a pretty large *Vial* big enough that the salt may fill only the fourth part of it, place the *Vial* in *Sand*, after you have stopp'd it with plain Paper, and by means of a little fire, you'll *sublime* the pure salt in fair *Crystals* a-top of the *Vial*. When you perceive the *Oyl* begin to rise

too, you must then take your *Viol* off the fire, and letting it cool, break it, to separate the *salt*, keep it in a *Viol* well stoppt, you'll have half an ounce.

This *salt* has the same virtues as the other I mentioned before, that is, you may give it from Eight grains to Sixteen in some Opening liquor, for the *Faundies*, for *Ischuries*, *Ulcers in the Bladder*, the *Scurvy*, *Fits of the Mother*, and upon all occasions where there is any need of removing *Obstructions*, and opening by way of *Urine*.

The *Spirit* and *Oyl* have the same virtues as those I have spoke of. If you would *Distil* in a *Retort* the *Mafs* which remain'd in the *Cucurbite*, until there comes away nothing more, you'll have a *Black Oyl*, which might serve *Women* to smell to in fits.

Remarks.

The *Cucurbite* must be sure to be large enough, for otherwise it will break while the *Vapours* are arising.

A *Clear Oyl* may be drawn from *Amber* in the first *Distillation* by mixing the *Amber* with an equal weight of *Sea-salt*, and *distilling* it in a *Retort* the usual way; there will remain likewise some *Volatile salt* in the neck of the *Retort*, which may be *Rectified* by *subliming* it in a *Viol* as I have said.

Add

Add to pag. 220. chap.

Of Ambergrieſe.

It is thought to be found no where elle but in the *Oriental ſeas*, though ſome of it has been known to be ſometimes met with upon the *Engliſh Coaſt*, and in ſeveral other places of *Europe*; the moſt of it is found upon the *Coaſt of Melinda*, and eſpecially at the *Mouth of the River* that's called *Rio di Sena*.

Add to pag. 233.

Remarks upon Diſtillation of Guaiacum.

During the *Diſtillation of Spirits*, you muſt not make the fire too ſtrong, for they coming forth with a great deal of violence, would elle be apt to break either the *Retort* or the *Receiver*.

Though the *Guaiacum* that is uſed is a very dry body, yet abundance of *liquor* is drawn from it; for if you put into the *Retort* four pounds of this *Wood*, at ſixteen ounces to the *Pound*, you'l draw at leaſt a *Pound* of *Spirit* and *Phlegm*, and four ounces of *Oyl*; as for the *ſalt*, you'l gain but half an ounce, or ſix drachms at moſt.

Add to pag. 238.

Remarks upon Oyl of Cloves per Descensum.

If you use a pound of *Cloves*, to Distil them *per Descensum*, according to the Description I have given, you'll draw an ounce and two drachms of *White Oyl*, and an ounce of *Spirit*; there will remain thirteen ounces and two drachms of matter, from whence might still be drawn a little *Red Oyl*.

Add to pag. 249. lin. 6. Chap.

Of Wine.

'Tis *Objected* to this last discourse, that the *Tartareous* part being in a *Natural* way separated from the *Wine*, should in no wise diminish the quantity nor the strength of the *Spirituous* and *Inflammable* part.

But when I asserted that the *Spirits* of divers *Wines* are extremely much loaded with *Tartar*, I did not mean that *Tartar* which *Petrifies* at the sides of the vessels, for that same is quiet, and does not hinder the *Exaltation* of *Spirits*; but I intended a *Tartar* that still remains mixt in the *Wine* after the *Fermentation*, and which according as it abounds more or less, does render the *Wines* more or less thick and gross. It is easy to see this *Tartar* I speak of, if you evaporate the

the aqueous part of *Wine*, for it will remain at bottom in form of *Lees*. Nevertheless there is no need of establishing two sorts of *Tartar* in one kind of *Wine*, for the former is only the more soluble part of the latter.

Divers little *Objections* have been made me on this subject, for want of duly examining what I have established. Wherefore I have no desire to enlarge my self in the relation of them, for it is my aim, as much as I can, to avoid all *Repetitions*, as being of no further use but to swell a *Book* and tire the *Readers* patience.

Add to pag. 256. lin. 32. In the

Remarks upon Spirit of Wine.

Some persons do endeavour to reject the *Method* that I have described for drawing *Spirit of Wine*, because, say they, a long time is required to draw a little *Spirit*, and by reason of the difficulty they conceive in procuring such Vessels well made, at *Paris*, and much more so in the *Country*.

But it is likely these *Gentlemen* do blame this *Method*, before ever they tried it; for if they had but taken the pains to make the *Experiment* of it, they would have found that with two or three of these Vessels, they might have drawn as much *Spirit of Wine*, as they could be able to do with their great *Machine*, and that this *Spirit* is not liable to the *Impression* which might be communicated to it from *Copper* or *Tin* vessels.

As for the difficulty that there is pretended of finding these *Glass* vessels, there is none at all that I know of, but only for such as will not take the pains to *visit* the *Glass-houses*, for there they would find enough for their turn; and though I use a great many of them in my *Courses of Chymistry*, I never was to seek for any yet. But suppose there were none to be found ready made, methinks they might as easily bespeak 'em, and have 'em made at the *Glass-houses*, as well as bespeak those grand *Copper* or *Tin Machines*, that are commonly used. I know those that are better pleased with making a *Fair shew*, than with the *effects* of things, and who measure the *goodness* of an *Operation* by the *trouble* it gives one, and by the *greatness* of *Vessels* and *Furnaces*, will find here but little to their *satisfaction*. But I am very little concerned at such mens exceptions, I never at all endeavoured to follow their *Road* way. My design is simply to facilitate the means of working in *Chymistry*, and to despoil it, as much as lies in my power, of those things which render it *mysterious* and dark.

Add to pag. 258.

Remarks upon Spirit of Wine Tartarized.

A sign, that the *Spirit of Wine* has carried along with it some of the *Salt of Tartar*, is this: if you dry gently the *Salt of Tartar* that remains in the *Cucurbite*, and weigh it, you'll find it diminished an ounce and a half.

You

You may again put this *Spirit of Wine Tartarized* to half a pound of more *Salt of Tartar*, in a *Limbeck*, and distil it as before, but I have found that it is ne'r a-whit the better for it.

This way of *Tartarizing Spirit of Wine* is the very best and shortest of all that have been invented, whether you desire to make it *Pure*, or to impregnate it with *salt of Tartar*; and I may venture to say, that all the many long and tedious descriptions that have been given of this Operation, have been only invented to cast a dust into the eyes of *Novices*; for it is easie for any to observe, who give themselves a little to examine things, that after all their long turnings and windings, and circumstances to no purpose, the *Spirit of Wine* is not so well *Tartarized*, as by the plain Method that I have described.

Add to pag. 259.

Remarks on the *Queen of Hungary's Water*.

The *Oyl* or *Essence* of *Rosemary* may be made as the *Oyl* of *Cinnamon*, and some drops may be put into *Spirit of Wine*, and thus we have a *Queen of Hungaries Water* presently made upon the spot. The *Water* of the *Queen of Hungary* sometimes gives ease to the *Tooth-ach*, being snufft at the *Nose*, or applied to the *Gums* with a little *Cotton*.

Some endeavouring to *Criticize* to little purpose, do say, it is altogether useless to digest
Rose-

Rosemary Flowers with *Spirit of Wine*, because their substance being of a very *Volatile* nature, it easily *dissolves* without any *Digestion*.

But this *Circumstance* is very *necessary*, if we desire to have a *Water* well *impregnated* with the *Essence* of the *Flowers*, for although there is a *Volatile* substance in *Rosemary*, yet good part of the *Oyl*, in which consists principally the *Smell*, is involved in the other *Principles*, and it cannot be well *Rarified*, mixed, and *Exalted*, but only by a *Digestion*: and thus we find a very good *Effect* from it.

Add to pag. 260. last line, Chap.

Of Vinegar.

Perhaps it will be *Objected* that *Wine* separated from *Tartar* and *Lees* grows *slowre*, when kept a long time in a vessel, without any *dissolution* of *Tartar*.

But we must consider that *Wine*, let it be as clear and pure as may be, does always retain the more *salt* and *subtile* part of *Tartar*, which exalts and easily smells, when by the *Fermentation* it gets the predominancy of the *Sulphureous Spirits*, which held it as it were involved: and thus clear *wine* *lowrs* when alone, but it does not *lowr* so fast, and the *Vinegar* is not so strong, as when it is made upon *Tartar*.

Furthermore if we consider the *Principles* that *Wine* consists of, we shall find, that neither the *Oyl*, nor *Earth*, nor *Water*, are capable of
yielding

yielding any *Acidity*, and that nothing but the *Salt* is able to give it. Now it can't be doubted but that the *Salt* of *Wine* is in the *Tartar*.

It may be added here, that the *Air* to which *Wines* are exposed, by leaving the vessel open, when they would have them turn into *Vinegar*, does likewise communicate a little of its *Acidity* to the *Wines*, in the stirring up, and rarifying the *Acid* of *Tartar*.

Add to pag. 262.

Remarks on Distillation of Vinegar.

Some having dried and calcined the sweet extract that remains at the bottom of the *Cucurbit*, after the *Distillation* of *vinegar*, and having by *Dissolution*, *Filtration*, and *Coagulation*, separated an *Alkali fixt salt*, much like unto that which is drawn from *Tartar*, they do mix it with *Spirit of vinegar*, and *Distil* and *Cohobate* it divers times, until, say they, the *spirit* has carried off all the *Salt*, and then will needs have it called *Spirit of vinegar Alkalized*, or *Radical spirit of vinegar*, and they assert that this being much more pure, and entirely united with its proper salt, is much more powerful in dissolving Metals. But far from the *Distilled vinegar* becoming the stronger through this Preparation, I can demonstrate that it breaks and loses the greatest part of its points in contending with the *Alkali salt*, with which it is mixt, for 'tis the property of this salt to sweeten Acids.

Nei-

Neither is it necessary to believe that by *Distillations* is drawn the *Alkali salt of Vinegar*, for it remains fixt at bottom of the *Retort* with the *Acids* it is impregnated with; so that this same *Spirit of Vinegar* to which so many great names and uses have been appropriated, is properly the more *Phlegmatick* part of *distilled vinegar*.

Add to pag. 264.

Remarks on Crystals of Tartar.

I see no reason so much to wonder as some do, why *Tartar* will not dissolve in cold water; for although it does contain a great deal of *Salt*, this salt is involved in *Earth*, and *Oyl*, which must needs hinder this dissolution, and there's no need of having recourse, for an explication of this, to a proportionate Union of *Volatile salts* and *Acids*.

Add to pag. 264.

Soluble Tartar.

Powder and mixe together eight ounces of *Crystals of Tartar*, and four ounces of the fixt salt of *Tartar*, put this mixture into a glazed earthen Pot, and pouring upon it three pints of common water, boil the matter gently for half an hour, then letting it cool, filter and evaporate the liquor until it is dry, and there will remain at bottom, eleven ounces six drachms of a white salt;

salt; keep it in a *Viol*, 'tis both a good *Aperitive*, and *Laxative*, it is good for *Cachexies*, *Dropsies*, and all *Diseases* that proceed from *Obstructions*: the *Dose* is from ten grains to two scruples in Broth, or some proper liquor.

Remarks.

This *Operation* is nothing but a *Dissolution* that the *Salt of Tartar* has made of *Cream of Tartar*, so that it can dissolve in cold water, which it could not do being alone; the *Cream of Tartar* also being an *Acid* insinuates into the *Pores* of the *Alkali salt*, and sweetens it.

If you Boil *Cream of Tartar* in water, and put into it some *salt of Tartar*, there will happen an *Effervescency* between 'em, but if you mix these two *Ingredients* together in cold water, there will be no *Effervescency*; the reason of which is, that the *Acid Spirits* of *Cream of Tartar* being involved in other *Principles*, can have no active power to penetrate the *Alkali*, unless they be actuated by fire.

I use to filter the *Dissolution*, in order to separate some terrestrious part of the *Cream of Tartar*, which could not dissolve: this *salt* comes near to *Tartar vitriolated* for virtues, some do call it *Vegetable salt*.

Chalybeated or Martial Crystals of Tartar.

Powder and mix a pound of good white *Tartar*, and three ounces of *Rust of Iron*, boil this mix-

mixture in an *Iron Kettle* with five or six quarts of *water*, for half an hour, or so much time as is requisite to dissolve the *Tartar*, pass the liquor hot through a warm cloth, then let it alone to settle in an *Iron* or *Earthen Pot* ten or twelve hours, it will shoot into *brown Crystals*, at the sides and bottom of the Pot, pour off the liquor by *Inclination*, and gather the *Crystals*; then evaporate over the fire about half the liquor in the same Pot, then let the remainder settle, and take out the *Crystals* as before; continue these *Evaporations* and *Crystallizations*, until you have drawn out all your *Tartar*, dry the *Crystals* in the *Sun*, and so keep them.

It is a good remedy for *Obstructions* of the *Liver*, *Mesentery*, *Spleen*; it is given in *Cachexies*, and for *Melancholy*, and the *Quartan Ague*; the *Dose* is from fifteen grains to two Scruples in Broth or some other liquor proper to the Distemper.

Remarks.

This Preparation is boil'd but little, that the *Tartar* may dissolve only the more *Saline* part of *Iron*; the liquor is made to pass through a cloth, to free it from the *Impurities* of the *Tartar* and *Iron* that could not dissolve; but you must pass it very hot, for if it were a little cool, the *Tartar* would *Coagulate* in the Cloth, and so none of the liquor would pass.

Instead of *Crystallizing* the dissolved *Tartar*, you may evaporate all the liquor, and so obtain a
brown

brown powder, which has the same virtues as the *Crystals*.

When you would exhibite this *Chalybeated Crystal of Tartar*, you must make it just *boil* in the liquor you give it in, for otherwise it will not *dissolve*, and you must be sure to give it as *hot* as they can take it, for fear it should *Cry-*
stallize at the bottom of the Poringer or Cup.

Soluble Tartar Chalybeated.

Put into an Earthen Pan, or Glass vessel four ounces of *soluble Tartar*, and sixteen ounces of *Tincture of Mars* prepared according to the description that I have given, set the vessel in *sand*, and with a small fire evaporate the humidity of the liquor, until there remains a *black powder*, shut it in a *viol* well stoppt, and keep it, you'll have eight ounces of it.

This *Martial Tartar* has the same virtues as the *Tincture of Tartar*, it is good to remove all *Obstructions*, wherefore 'tis very properly used in *Cachexies*, *Dropsies*, retention of the *Menstrua*, in *Nephritick Colicks*, and *difficulties of Urine*: the *Dose* is from ten grains to half a drachm, in some proper liquor, or else made into *Lozenges*.

Remarks.

This Preparation of *Chalybeate*, or *Martial Tartar* is not only more convenient for use than the former, (in that it *dissolves*, or mixes in

a cold liquor) but has much more virtue in it, for the *Tincture of Mars* contains only the more salt part of *Tartar*.

Add to pag. 269.

Remarks on Soluble Emetick Tartar.

Volatile Spirit of Sal Armoniack may be used instead of that of *Urine*; but then there will appear no sensible *Ebullition*, the reason of which is, because the salt of this *Spirit* is not so open as the *Spirit of Urine*, by reason of some impression it has of the *Acid sal Armoniack*, with which it was mixt; insomuch that the *Crystals of Tartar* whose *Acid* is not separated from the *Earth*, has points too gross and too unactive to insinuate into the *Pores* of this salt, and divide its parts so easily as those of the salt that's contained in *Spirit of Urine*, whose *Pores* are bigger.

Another sort of *Soluble Emetick Tartar* may be made by boiling in Water an ounce of the *Glass of Antimony* in Powder, with four ounces of *Soluble Tartar*, for seven or eight hours, then upon Filtring and evaporating the liquor, there will remain a grey Powder of the same virtues as the other, and to be given in the same Dose.

Add

Add to pag. 268.

Remarks upon the Fixt Salt of Tartar, and its Oyl.

I commonly use to draw this way four ounces of very *white*, and well *Purified* salt of Tartar, from each pound of *Red Tartar*; a little more may be drawn from *white Tartar*, but it is no better than the other.

I have observed that when *water* is thrown upon the *Mass* of Tartar newly *Calcined*, it *heats*, much like unslack't *Lime*, when wetted; the reason of which is the same that I have given, to explicate the *Ebullition* of *Quick-lime* in *water*: all the difference is this, that *Tartar Calcined* containing a great deal of *Salt*, does more easily imbibe *water* than *Quick-lime*.

Some do *Calcine* salt of Tartar with a little *sulphur*, to hinder it from *dissolving* so easily by the *Air*, and to *whiten* it the more; but this is no good practice, because the *Acid Spirit* of *sulphur* destroyes some part of the *Alkali*; and this does come to happen, by reason that the *Pores* of this *Salt* by being thus *Calcined* are not so open as they were, and the *Air* therefore cannot so easily melt it. If you would desire to make *Salt of Tartar*, and other *Alkali fixt salts* very *white* indeed, you must *Calcine* them all alone in a great fire, until they become *white*, and then *Purify* them by *Dissolution*, *Filtration*, and *Coagulation*. As for their proneness to
H dissolve,

dissolve, this accident is *Natural* to *Alkali salts*, and it cannot be taken from them, but by destroying their nature.

Nor can I approve the addition of some quantity of *Niter* to the *Calcination* of *Tartar*, as some will do, because the *Volatile* parts of *Niter* being exalted, the *fixt* do remain, and by their *Acidity* do diminish the virtue of *Salt* of *Tartar*.

Alkali salts are *Aperitive*, in that they dissolve those *slimy* humors which caused *Obstructions*; and it is for the same reason that *Salt* of *Tartar* does correct *Senna*, and hinders it from griping, for the substance of *Senna* being *Viscous*, this does *Rarifie* it, and make it work the quicker; it may also serve to dissolve some *viscous Phlegm* that sticks to the *Intestines*, which as it is going off, causes griping pains.

Add to pag. 272. the last line in

Remarks upon Magistery of Tartar, or Tartar Vitriolated.

If you use two ounces of *Salt of Tartar* in this Operation, you'll draw two ounces and a half of *Tartarum Vitriolatum*. This *Augmentation* comes from the more heavy and strong part of the *Vitriol*, for the humidity that is *Evaporated* is very *Phlegmatick*,

You may here use the *Rectified Oyl* of *Vitriol* instead of the *Spirit*, and then the less is requir'd, because it is a stronger *Acid*, but the *Tartarum Vitrio-*

Vitriolatum will not be so white, as when *Spirit of Vitriol* is used, by reason of some *Tincture* that always remains with *Oyl of Vitriol*, Rectifie it as much as you please.

Though some have written, that if *Tartarum Vitriolatum* should be put into a *Retort*, and actuated by fire, one might draw *Spirit of Vitriol* as good as it was at first, nevertheless 'tis certain 'twill not be so strong a *Spirit*; for it has lost the most subtle part of its *Acidity*, by encountring with the *Alkali*, which may be easily judged both by the *Taste*, and the *Effects*.

If by way of *Curiosity* you would search a little narrowly into this Operation, and observe what happens during the *Ebullition* of *Acid* and *Alkali*, you'll find, that a great many little dashes of water do fly about, especially if the vessel is not placed too low, and you hold a lighted *Candle* near it, for they will be apt to put it out. This *Effect* can have no other cause than the violent separation of the parts of *Alkali* by *Acid*, which makes the watry part of this liquor sprinkle it self upwards, it being on all sides furiously driven.

If you use *Oyl of Vitriol*, the *Ebullition* is the greater, and the heat the more considerable, because its *Acid* being stronger, it separates the parts of the *Alkali* body with more ease.

Now considering the *Ebullition* which happens between *Acid* and *Alkali*, I have the less opinion of a *Method* that some follow, which is to bathe a little the bodies that are to be *Embalmed*, with *Spirit of salt*, and then to put *Salt of Tartar*

into the *Embalming Powder*; for it is very likely, that this *Spirit of Salt*, which is an *Acid*, by mixing with the *Alkali salt of Tartar*, produces a *Fermentation* which may stir up the remaining humidity of the *Carkass*, and make it enter into the *Ingredients* of the *Powder*, and so instead of *Preserving* the dead body intire, we may have reason to fear lest this *Fermentation* should rather hasten the *dissolution* of its parts.

Add to pag. 274. lin. 27. in the same

Remarks.

Leaven does encrease the *Fermentation* in *Dough*, as being a *Paste* it self, whose *salts* are made free by a long *Fermentation*; these *salts* do joyn with those of the other *Paste*, and assist them both to rarifie and dissolve.

The same thing may be said of divers other *Acids* which do cause a *Fermentation*.

But when the *Acids* have rarified the matter as much as they can, they there lose their motion, and then there happens a kind of *Coagulation*, that is to say, the matter returns into its first dimensions.

Again there is one effect of *Acids*, which seems different from those I mentioned before, and it is that they can preserve certain bodies that are put into them, as salt preserves meat. Thus when young *Cucumbers*, *Saxifrage*, *Capers*, &c. are set a steeping in *Vinegar*, there happens no *Fermentation* at all, and consequently no *Corruption*.

The

The reason of which is, that the parts of *Cucumbers*, and other things I mentioned, being of a *viscous* nature, the *Acids* do insinuate into them for to dissolve them, but they have not motion there free enough to make their attacks, and separate the parts, so that the *Acid* of *Vinegar* does only fix it self in the Pores of these bodies, and there *Coagulate*.

It is this *Coagulation* that hinders the *Cucumbers* from *corrupting*, for these *Acids* do stop up their *Pores* and serve as so many little *Peggs*, to keep the parts firm and quiet. *Sea-salt* which is an *Acid* does preserve meat, and several other things for the same reason; but I have spoken something of that in the *Remarks* upon the *Principles*.

Add to pag. 276. the end of the same
Remarks.

Another *Objection* may be made to what I have said touching *Digestion*; it is, that whereas I maintained that *Acids* do *Dissolve* when they abound, and *Coagulate* when there are but few in a great deal of matter, it should happen that *Spittle* should then be apter to *Coagulate* the *Aliments* in the *stomach*, and cause *indigestion*, than would a greater quantity of *Acids*, for it seems, according to my *Discourse*, the more *acids* are found in a matter, the more liable it must be to *dissolve*.

To resolve this difficulty, which seems to be very considerable, we must observe, that the

natural acids of *Aliments* taken into the *stomach*, are sufficient to *rarifie* and *dissolve* those bodies which hinder their motion, when they have been stirr'd up by *Mastication*, or by some *salt* of the *spittle*, which serves as a *Leaven* to them, much after the same manner as the *salts* of *Meal* do *rarifie* the *Paste*, when they are actuated by means of *Trituration* and *Leaven* together; but now if there happens to be too much *acid* in the *Aliments* that are taken into the *stomach*, they will have the same effect as *Cucumbers* and those other things I mentioned, which *preserve* in *Vinegar*. The *acids* will indeed endeavour to cut in pieces what stands in their way, but having to do with parts too viscous and heavy, they will soon lose all their motion, and fix by their quantity, and by their gravity the *natural salt* of these *aliments*, as *Vinegar* fixes that of *Cucumbers*; for whereas the *acids* do shut the *Pores* of the matter, and keep them firm and quiet, the *natural salt* can't be able to *exalt* so as to cause *Fermentation* or *Digestion*.

The reason then why a small portion of *acids* will cause *Digestion* in the *stomach*, and a greater quantity will hinder it, is that the small quantity will joyn with the *natural salt* of *aliments*, and have its operation without stopping the *Pores* of the matter, whereas a great store of *acids* will quite stop up the *Pores* of this same matter, and hinder the motion of the *natural salt*; for it is not enough that there are a great many *acids*, to cause a *dissolution*, these *acids* must have room to move in, and make their attacks.

Thus

Thus these *Effects* make nothing against what I asserted concerning *acids*, for a greater quantity of them will always have more disposition, and tendency to a *dissolution*; but if this great quantity does *Coagulate* divers things, it is only by accident, and by reason of the disposition of the matter into which the *acid* points do ule to enter.

What I have established concerning *acids* may serve very much towards the explicating of *Fevers*, and their principal *symptoms*.

First of all every body must grant, that when there are *Obstructions* in our Bodies, the *obstructed* matter does *Ferment* and *sowr*, as *Dough*, *Wine*, and several other things grow *sowr* by being *stale*.

This matter by *Fermenting* sends *salt* or *acid* vapours into the *Mass* of *Bloud*, which do cause diverse Alterations in it, according to their quantity, and quality, for these *acids* are commonly mixt with *sulphurs*, which are a kind of Vehicle to the *acids*, and are more or less *corrupted*, according as the matter whence they are derived have sojourned more or less in the *Obstructed* part.

Now if these *acid vapours* are carried into the *Vessels*, but only in such a quantity as is fit to make a kind of *Leaven* in the *Bloud*, they will then *rarifie* the *Bloud* too much, and whereas they by consequence encrease its *motion* and *heat*, they do cause that which we call a *Feaver*; this *Feaver* must remain as long as the *Ferment* continues in the *Bloud*, and according as

there comes a new supply of matter in place of what nature has thrown off.

But if a greater quantity of *acids* rises all of a sudden from out of the *Obstructions*, then there must needs happen a kind of *Coagulation*, for these *acids* thus abounding, and fixing the grosser part of the *Blond*, do partly lose their motion, and quiet the *Ebullition* of the *Blond* by fixing its parts.

It is this kind of *Congelation* which causes those Cold Shiverings, which are felt, before the Hot Fit begins; for as the Heat is derived from the motion of the *Spirits*, the Cold is produced from the cessation of their motion.

The Cold fit continues until the *Spirits* have by their activity rarified this *Congelation*; for the *Spirits* being continually supplied with additional forces do violently assault the passage 'till they have broke it open, and made their way free.

The *Coagulum* being dissolved, the *Blond* should seem to *Circulate* as it did before, but because the matter of the *Coagulum* is converted into a *Leaven*, this *Leaven* makes the *Blond* to Boil, and so causes a *Feaver*; this *Feaver* continues until the *Blond* is freed from all this *Ferment*, either by *Transpiration*, or by way of *Urine*.

Now to conceive how this *Coagulum* may be converted into a *Leaven*, we must consider that the *Spirits* of the *Blond* have lost most of their acidity in dissolving this *Coagulum*, and that there remains but only acidity enough to produce a *Fermentation*.

Never.

Nevertheless you must not think I mean by this *Congelation* now spoken of, a *Coagulum* altogether like unto that in *Milk*, or to that which happens, when an *acid liquor* is *syring'd* into the *Veins* of an *Animal*, for these *Congelations* are too strong, and there would then happen to us the same thing, or very near the same as does to the *animal*, who soon afterwards falls into *Convulsions*, and *dies*, because the course of the *Spirits* and *Blond* would be intirely stop't, and they would never be able to break through so great an obstacle: but I understand here that the *Blond* is made thicker than it was, and has not so free a motion as it had before, which is enough to cause such *cold Fits*.

Now there remains for me to explicate how it comes to pass that *Feavers* have their abatements and returns regularly by *Fits*.

The matter that makes the *Obstructions* which I have laid down for the *Fundamental Cause* of *Feavers*, begins not to send out its vapours, nor disperses its *acid salt* into the *Blond* in order to cause a *Feaver*, until it has got together a certain quantity in the *obstructed vessels*, and then it is probable there is a kind of *Eruption* of the matter.

This *Eruption* of *Feaverish* matter must happen at set times, so long as the *Obstruction* lasts, because the humors which *Circulate* to the *obstructed* parts, and there stop, are alwayes in an equal quickness and quantity.

Now seeing that in a *Tertian Ague*, the vessels wherein the *obstruction* happens, do acquire in two
dayes

dayes time a sufficient repletion of matter to produce the *Eruption* and *Fermentation* I have spoken of, the *Fits* do come to operate every second day.

But because in a *Quartan Ague* the humors are more tenacious and heavy, and flow with expedition, the *Fermentation* and *Eruption* must needs be slower and consequently the *Fits* more distant the one from the other.

The *Quotidian Ague* is caused by a *Salt Pituita*, which is naturally fluid enough to make the matter ferment in less time, wherefore it is that the *Fits* do return every day.

We may reason concerning the other kinds of *Fevers* upon the same *Principle*, and explicate all the accidents that happen, but I have no design to enlarge my self further upon this subject, I should think it would be too great a *Digression*, and a Book might rather be made on purpose, to express all the circumstances which might be deduced from it.

Volatile Salt of Tartar.

Dry the *Lees* of *Wine* in a gentle fire, and fill with them two thirds of a large earthen or glass *Retort*, place this *Retort* in a *Reverberatory Furnace*, and fitting to it a large *Receiver*, give a small fire under it to heat the *Retort* by degrees, and to drive out an insipid *Phlegm*; when vapors begin to rise, you must put out the *Phlegm*, and luting carefully the junctures of your vessels, quicken the fire by little and little, until you find
the

the *Receiver* filled with *white Clouds*; continue it in this condition, and when you perceive the *Receiver* to cool, raise the fire to the utmost extremity, and continue it so, until there rise no more *Vapours*. When the *Vessels* are grown cold, unlute the *Receiver*, and shaking it about to make the *Volatile salt* which sticks to it fall to the bottom, pour it all into a *Boulthead* with a long neck; fit to it a *Head* with a small *Receiver*; lute well the *junctures*, and placing it in *sand*, give a little fire under it, and the *Volatile salt* will rise, and stick to the *head*, and the top of the *Boulthead*; take off your *head*, and set on another in its place: gather your *salt*, and stop it up quickly, for it easily dissolves into a liquor; continue the fire, and take care to gather up the *salt* according as you see it appear; but when there will rise no more *salt*, a liquor will distil, of which you must draw about three ounces, then put out the fire.

This *salt* is had in great request to Purify the *Bloud*, by *Sweat* or *Urine*: it may be given in the *Palsie*, *Apoplexy*, *Epilepsie*, *Quartan* and *Tertian Agues*, to open *Obstructions*; the *Dose* is from six grains to fifteen in some proper liquor.

The *Distilled liquor* is a *Volatile salt* that's risen with *Phlegm*; it is called the *Volatile Spirit of Tartar*, and has the same virtues as the *salt*; its *Dose* is from eight to four and twenty drops.

After this same manner the *Volatile salt* of *Beans*, *Soor*, and divers *Fruits* and *Seeds* may be Prepared.

Re-

Remarks.

The *Lees* of *Wine* being incomparably more *Fermented* than the *Tartar* which is found in the sides of Vessels, we need not wonder if its *salt* is more *Volatile*.

This *salt* is *sublimed* in a *Boulthead* with a long neck, to the end the *Phlegm*, which is too heavy to rise easily so high, may not much mix with it; but it is extraordinary hard to keep this *salt dry*, it easily humects and dissolves into liquor, wherefore it were much better to draw it in a *Spirit*, and less of the *Volatile* part would be lost, being detained by *Phlegm*.

Nevertheless because there are several persons who are as well pleased with the *sight* of things, as their *Effects*, this *liquified salt* might be mixt with a sufficient quantity of *Calcined Bones* powdered, to make thereof a *Paste*, which might be made into little *Pellets*, to be put into a *Boulthead*, and fitting to it a *Blind head*, this *salt* may be *sublimed* or *Rectified* as before, and this pure *salt* must be kept in *Viols* well stoppt.

The difficulty there is in keeping this *Volatile salt dry*, as well as that of other *Vegetables*, does proceed from this, that only the more *Essential* part is *Volatilized*, for there remains much *fixt salt* with the *earth* in the *Retort*.

This *Volatile salt* becomes *Alkali* by the means of fire, as the other *Volatile salts* do, whereof I have already spoken in my *Remarks* upon the *Principles*; and there is no manner of probability

lity that it should have been of this nature, either in the *Plant* or in the *Lees*, for the reasons that I have shewn in the same *Remarks*.

I shall add here, that if the *Alkali salt* did exist in the *Lees*, but is not able to unfold it self, and get the predominancy of *Acids* but only by a long *Fermentation*, as the *Chymists* will have it, who follow the common way of discoursing of these things, it would then necessarily follow that the more *Lees* do *Ferment*, the more they must lose of their *Acidity*, because the *Alkali* would destroy it. Nevertheless the contrary to this happens; for *Lees* do *sowr* as they grow *stale*, and those who make your *Vinegar*, do know well enough how to use *Lees*, and make them *Ferment* with their *Wine*, when they would use a quick dispatch in making *Vinegar*.

It seems to me from the consideration of this effect, that there is little reason to follow the Sentiments of some, who have writ that the *Lees* of *wine* abounding in *Volatile salt*, and a *sulphureous spirit* do contain but very little *Acid*; for it is as plain as may be that this *Volatile salt* is *Acid* in the *Lees*, and is the same that makes the *Acid spirit* of *Vinegar*, as being more *Volatile* than many other *Acids*, to *Volatilize* along with its *Phlegm* in the *distillation*. It is true that *salt* of *Tartar* drawn by the *Retort*, does rise more easily than the *Spirit* of *Vinegar*, but this is from its being *Volatilized* by the violent heat of fire.

Another mark that all the *salt* of *Lees* is *Acid*, is this, that the *Tartar* does all dissolve in the *wine*, and turns into *Vinegar*; for very little or

no *Lees*, or other *Tartar*, is to be found in the *Barrels* wherein *Vinegar* was made, although there was some before as nature made it, or though some other was added to it.

Perhaps it will be *Objected*, that *Lees* are sometimes added to *Wines* grown rosy and mucilaginous to make them good again, and those *Wines* are not soured by the *Lees*.

But this effect happens, when the former *Fermentation* becoming imperfect, through the too great quantity of *Phlegm*, for the little proportion of *Salt* that was in the *wines*, the *salt* of the *Lees* does *rarifie*, exalt, and involve it self in some measure in the *Oily* parts of the liquor that the *wine* is made of, as I have said in the *Chapter of Wine*.

For the *Wine* does not sour, so long as the *salt* finds *Oyl* to act upon, but it does so, when this *salt* finds nothing to hinder it from separating.

The *Volatile salt* of *Tartar* produces much the same effects, as that of *Beans*, and other *seeds*, and though many will needs give it such sublime and extraordinary virtues in comparison with other *Volatile salts*, I do not see any reason for such high fancies, nor that effects do answer their *Pretences*.

Volatile salts have a good use, when they find the *Pores* and *Humors* disposed for *Transpiration*, but they are full as dangerous, when the *Humors* are not at all *Prepared*; for by their *Volatility* they do so stir them up, that oftentimes the *Feaver* is known to be increased by them, and translated

to the *Brain*: wherefore you must be sure to consider well the *Temper* and present state of your Patient, before you presume to give them.

That which remains in the *Bottlehead*, after the *Volatile salt*, and *spirit* are drawn off, is a black and stinking *Oyl* mixt with the more *Pblegmatick* part of the liquor; you must separate this *Oyl* in a *Funnel* lined with brown paper; it is good for the *Palsie*, *Cold pains*, and for *Hysterick* women to smell to.

A *Lee* or *Calcined Tartar* is found in the *Retort*, out of which you may draw a fixt *Alkali salt*, as out of common *Tartar*, but in a lesser quantity, for that the greatest part of the *Salt* of *Lees* is *Volatilized*.

Add to pag. 278.

Extract of Opium called Laudanum.

Opium does mitigate all pains which proceed from too great a subtilty of the humours, it is good for the *Tooth-ach*, being applied to the *Tooth*, or else made into a *Plaisber*, and applied to the *Artery* of the *Temples*; it is used to stop *spitting of blood*, *Dysenteries*, *Fluxes* of the *Menstrua*, and the *Hemorrhoids*, for *Colicks*, *defluxions* of sharp humors upon the *eyes*, for *Rheumatisms*, and to ease all sorts of *Gripping pains*. The *Dose*, &c. as before.

Add

Add to pag. 284.

Remarks upon Landanum.

Some have writ in opposition to what I have establish'd on this subject, and say, that if we have regard to the quantity of *Narcotick vapours* that may arise from a *small Dose of Opium*, it ought not to be imagined that those *Vapours* should be able to shut the channels of the *Spirits* and *humours* which make a *defluxion* upon some part; but that we should rather conclude the *mitigation of pains*, and *stopping of defluxions* to proceed from a just proportion of the *salt and sulphur of Opium*, and from the *secret Ferment* they contain.

But this *Objection* will give us but little trouble in the answering, when we consider that although the *Vapours* caused by it are but few, yet the vessels of the *Brain*, in which the *Animal Spirits* do move, are exceeding delicate, and easie to be obstructed; and that the too great activity of the *Spirits*, which often fly into the diseased parts, being thus abated by the *viscous* nature of *Opium*, there must needs follow thereupon some ease and comfort, without any need at all of admitting a *stoppage* of the *Vessels*. And again we may conceive, that all the *Opium* that was taken, being capable of being *Rarified* into *vapours* by the *heat of the body*, there must needs be produced good quantity of them.

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As for the proportion of *Salt*, and *Sulphur* in *Opium*, and the *secret Ferment* they pretend to acquaint us with, in order to *Explicate* this matter, I know they are high terms indeed, but illustrate very little; for though they say these *salts* and *sulphurs* do unite with *Homogeneous* particles that they meet with, and destroy such as are the cause of the Distemper, we can never by this means receive any clear *Idea* of that which makes *Opium soporiferous*.

Besides the virtue which *Opium* has to cause sleep, I have observed that it is often *Indorifick*. I conceive this effect must not be attributed only to the *Volatile* parts of this mixt, which may be thought to operate this way, after they are disengaged from its *viscosity*, but rather to this, that during sleep, the inward vessels being as it were *obstructed*; or in some manner *Coagulated*, and the *Spirits* finding resistance in their passage, do *reflect*, or turn their motion to the outward parts, and draw along with 'em some *moisture* through the *Pores*. That which confirms me in this opinion is the consideration, that divers persons do use always to *sweat*, when they are a-sleep, though they have not taken any *Opium* at all. Now it may happen that in the operation of *Opium*, the *Spirits* finding more resistance within than they are wont, may tend outwards with the more force, and consequently incline to *sweat* more than in *natural sleep*.

Some prejudiced Chymist may not relish perhaps this my *Explication*, because I don't *reason*

it with salt enough, and sulphur, and other Principles; but although the five Principles which may be drawn from other Vegetables, may also be drawn from Opium, I never use them but to explicate some Effect; for whensoever I find they are not able to satisfy my reason, nothing shall hinder me from pursuing my thoughts and searching elsewhere for some better explication. In fine the Beauty of Chymistry does not consist in suiting our opinions to those of ordinary Chymists, who resolving to explicate all the Events of nature by their received Principles, which they manage according to their own fashion, do reject as ridiculous whatsoever does not agree with their Sentiments; but it rather consists in examining and imitating what is done Naturally, and so searching for reasons that are most probable, and such as may be said to come nearest to truth, though one is fain to forsake the way that others have trod in.

Add to pag. 285. Chap.

Of Aloes.

Aloes is not only used inwardly, as I shall say speaking of its Extract, but it is also used outwardly in many Unguents and Plaisters that are Deterfive, and Resolutive.

Its Tincture is also drawn with Spirit of wine, by the same Method as I shall describe that of Myrrhe; it is resolute, deterfive, good against Gangrenes, and to Incarnate: it is used in Injections to dissolve Gypsous humours, and to cleanse Wounds, and old Ulcers. Add

Add to pag. 291. lln. 3. in

Remarks on *Extractum Panchymagogum*.

Spirit of Wine is commonly used to make this *Extract*; and it may seem to be so much the purer, being drawn by this dissolvent, rather than by a watry menstruum; for spirit of wine dissolves only the more Balsamick and purer part of mixt bodies: but nevertheless I choose rather to prefer the use of Dew, or else Rain-water, nay and common water before Spirit of wine for several reasons.

First, because in the *Evaporation* of the humidity of the *Extract*, drawn by Spirit of wine, a great many of the more subtile parts are lost, which this dissolvent had Volatilized. And indeed it cannot be denied, but some parts will evaporate, let us use what dissolvent we please; but it is plain there is no such great loss, when watry menstrua are used, as when spirit of wine. Now we should always prefer such menstrua, as are best able to preserve the virtue of the mixt, whose *Extract* we intend to draw.

The second is, because Spirit of wine does alwayes leave some impression of heat and actimony in the *Extracts* it draws, which the liquors that I use don't do.

The third is, because spirit of wine is not so convenient a menstruum to dissolve the salts which the *Ingredients* we use are full of, and it is in this salt, that their greatest virtue does consist.

Wherefore we ought to choose such *dissolvents*, as best preserve the virtue of *mixt* bodies, and such as are *familiar* to our nature. We must use *Spirit of wine* to extract *Rosines*, such as that of *Scammony*, *Galap*, *Turbith*; but whenever an *Extract* can be drawn with a *watry menstruum*, it is better to use that, rather than another, for the reasons I have mentioned.

Add to pag. 304. after the chap.

Of Gum Ammoniack.

CHAP.

Of Myrrhe.

MYRRHE is a *Gummy juice* that distils from a *Spinous Tree*, of a middle height, by *Incisions* that are made into it; this *Tree* grows commonly in *Ethiopia*, and *Arabia*, and because the *Inhabitants* of those countries are thought to feed on *Serpents*, the *Myrrhe* that is brought thence is called *Troglodytick*. The *Antients* were wont to collect from the same *Tree* a *liquor* that fell from it without *Incision*, which was called *Stacten*; 'tis only a *liquid Gum*, but I am apt to think it should have more virtue than common *Myrrhe*, because it was the more *spirituous* part, which filtrated through the *Pores* of the *Bark* of this *Tree*.

You

You must choose such *Myrrhe* as is friable, light, odoriferous, clear, and such as is in small pieces, of a Yellowish colour, and bitter to the Taste; it is aperitive and resolute; it is much esteemed for *obstructions* of the *Uterus*, and to bring the *menstrua*, and to quicken Womens *Labour*; it also resists malignity of humors, it is used in *Corroborative Remedies*, and resolvent *Plasters*.

Tincture of Myrrhe.

Put what quantity you please of good *Myrrhe* powdered, into a *Boulthead*, and pour upon it *spirit of wine* four fingers high; stir the matter and set it in *digestion* in warm sand, for two or three dayes, or until the *Spirit of Wine* is loaded with the *Tincture of Myrrhe*; then separate the liquors by *Inclination*, & keep it in a *Viol* well stopr. It may be used to expedite Womens *Labour*, to bring down the *Menstrua*, and in the *Palsy*, *Aplexy*, *Lethargy*, and all diseases that proceed from *Corruption* of humors; it is *Sudorifick* and *Aperitive*: the *Dose* is from six drops to fifteen in some proper liquor: it is commonly used in outward applications, or mixed with the *Tincture of Aloes* to discuss cold *Tumors*, and to dissolve *Gypsous* humors by way of *Injection*, and for the *Gangrene*.

Remarks.

Though *Tinctures of Myrrhe* are daily drawn in *Wine*, or *Aqua vita*, notwithstanding the best

that can be Prepared is with Spirit of wine, because this *Menstruum* receives the more Oyl, or *Ballamick* part of *Myrrhe*; whereas the *Phlegm* of Wine, and *Aqua vite*, do cause these liquors to dissolve, and impregnate with the more *terrastrisus* part of the Gum, as well as with the Oyl.

Some do use to evaporate this Tincture to the consistence of an *Extrakt*, but because thereby they are fain to lose the more *Volatile* part of the *Myrrhe* with the spirit of wine, I do conceive it better to use the Tincture it self as I have described it.

Oyl of Myrrhe per Deliquium.

Boil Eggs until they are grown hard, then cutting them in two, separate the Yell, and fill the White with *Myrrhe* powdered, let them on little sticks placed conveniently on purpose in a plate, or earthen pan, in a Cellar, or some such moist place, and there will distil a liquor to the bottom of the vessel, which you may take out, and keep for use. This is called the Oyl of *Myrrhe*; it is good to take away Freckles, and Tetter, applied outwardly.

Remarks.

Though this liquor, improperly called Oyl, is only the more soluble part of *Myrrhe* humected with the moisture of whites of Eggs, and the Cellar together, yet it is the best of any that have been

been invented; whether you draw it in Spirit of wine, or distil this Gum in a Retort; for by spirit of wine the more Volatile part of Myrre is lost, either by Distillation, or Evaporation; and it is so Torrifed in a Retort, that it loses its best virtues; whereas per Deliquium what Volatile this Gum contains is preserved in its Natural being, for the humidities that mix with it are no ways capable of destroying or altering its nature.

Add to pag. 309. l. 11. in the Chap.

Of Vipers.

I am apt to conceive, that the Venom of Vipers is caused by an affluence of Acid salts, violently thrown forth, and which by insinuating into the Veins, do by degrees cause a Coagulum in the Blood, to hinder its Circulation, and the course of the spirits; this opinion is the more probable, in that Coagulated Blood has been found in the Veins of many Animals, which have been bit by the Viper, and besides the most powerful Remedy that cure this Poison, are Volatile Alkali salts, which are proper to dissolve the Coagulum.

As for what may be said, that if this discourse were true, the Natural acidity of the Blood would Coagulate it sometimes, as it happens to Milk, which Curdles of it self; and that this Coagulation would produce the same effects as does the Venom of Vipers; this Objection raises no difficulty at all. For the Blood circulating

in its *Natural* way, the *Acidity* that is in it is so well united to it, that it cannot separate to make a *Coagulum*, no more than the *acidity* that is in *milk* can separate from it, whilst the *milk* remains in the *Teats*, for we see it never ules to *Curdle* there, unless occasioned by some *Distemper*.

And again, who can doubt but certain *Pestilential Airs*, or divers *Diseases* that come from the corruption of the humours of the body, may be able to *Coagulate* the *Blond*, and have the same effect as the *venom* of *Vipers*?

Add to pag. 314. the bottom of the page in

Remarks on Distillation of Vipers.

There is another way of *Rectifying* the *Volatile salt*, which is by mixing it with five or six times as much *Bones*, or *Horns* burnt *white*, and putting the mixture into a glass, or earthen *Cucurbit*, then fitting to it a *blind head*, or such a one whose *Nose* has not been opened, after that luting well the *junctures*, then setting the vessel in *sand*, and with a gentle fire the *Volatile salt* will rise, and stick to the *head*, you must continue the fire until there rises nothing further.

This *salt* is hereby purified from a great deal of its *Oyl*, which remains in the powder of *Bones*, wherefore it is *whiter* than it was, and pleasanter to the *Palate*. It may again be mixt with other *Calcined Bones*, and *sublimed* as before, to render it the *purser* still, and take away the more of its *unflavoury* smell, that's caused partly by the *Em-*

pyrenma

pyrenematical oyl that it draws along with it in the distillation.

Add to pag. 316. the end of the same

Remarks.

If you distil two and thirty ounces of shavings of *Harts-horn*, you'll draw thirteen ounces of liquor, and *Volatile salt*, and there will remain in the *Retort* nineteen ounces of matter as black as any Coal.

You'll draw from the liquor an ounce and a half of *Volatile salt*, six ounces of spirit, and two ounces of *Black Oyl*.

The black matter being grinded on a *Marble* is good for *Painters* to use; if you *Calcine* it, the fuliginous parts which make it black, will fly away, and leave the *Hartshorn* very white; you'll have sixteen ounces of it, and this is called *burnt Hartshorn*. It is accounted *Cardiack*, but indeed has no other virtue than to destroy *Acids*, as all other *Alkali* matters do too.

Some do use to stratifie *Hartshorn* with *Bricks*, and *Calcining* it that way, they call it *Hartshorn* prepared *Philosophically*, they account it more *Cordial* than it was before; but they are very strangely mistaken, for the *Volatile salt*, and *Oyl*, which were the things that should render it *Cardiack*, were carried away in the *Calcination*, and there remains only a *Terrestrious* matter that might be called *Caput mortuum*. Notwithstanding it is an *Alkali*, that may serve as *Crabs-*
eyes

eyes; Coral, and divers other matters of the like nature, which absorb *Acids*; the *Bricks* bestow no virtue at all on it.

small white brs and drs of LBA

Add to pag. 323.

Remarks on the Distillation of Wax.

If by way of curiosity you desire to know exactly what quantity of liquor, or spirit, can be drawn from *Wax*, you must dry your *Bellus* as much as you can, or else use in its place, broken pots, or *Bricks* powdered, which are not at all wet, out of three and twenty ounces of *Wax*, you'll draw in the first *Distillation* just the same weight of liquor; to wit, twelve ounces of *Phlegmatick spirit*, and the rest is a *Butter*; in the second and third *Distillation* you'll draw fourteen ounces of spirit, and six ounces of clear

Spirit of Wax is only a small quantity of *Acid Volatile salt* dissolved in *Phlegm*; but you must not believe what some have written, that having *Distilled* a considerable quantity of *Wax*, and put that which was drawn into a *Beuthead* with a long neck, they could *sublime* the *Volatilsalts* like others of that nature, For this salt, though it is indeed *Volatile*, yet it is not *Volatile* enough to rise before the *Phlegm*; it is an *Acid salt* much like unto that of *Amber*, but is not of the nature of *Volatile Alkali's*, which are known to *sublime* so easily; it were better therefore to keep this spirit as it is, or else to evaporate about half of it

it with a very cold heat, that it may be the stronger.

The Volatile Salts of many Sulphureous matters are drawn Acid, as they were at first in the mixt. because being cloathed with soft and porous parts which give way easily to their motions, they do not break their natural kennels in endeavouring to separate, when they are forced by fire, and so they do not receive so much terrestrious and fiery matter, as is requisite to make them Porous, like Volatile Alkali's.

Methinks this Operation, and the Distillation of Amber which I have described, do much confirm what I said before in my Remarks upon the Principles, that all the salt of mixt bodies is naturally Acid, and that Alkali is nothing else but a mutation made by fire. Besides, all sorts of Experiments do seem to me to confirm and establish this Opinion; but yet I am not so peremptory in the vindication of it, but would gladly give place to another, if I could be shewed that it is better than mine, for I seek after nothing else but real Truth.

Neither would I have it thought, I am so full of Vanity, as to vaunt my self for the first Author of this Opinion, of many other thoughts, and of all the wayes of Operation that are to be found in my Book, as if for certain they were never writ before; for although I can assure my Reader, that they are dictates of my own conception, and that I have not searched into any Author whatsoever to find them out; it may have hapned nevertheless, and I am willing to think

think so, that many others besides my self may have thought and written the same things that I have done, and with *more order and decorum*. All the *glory* therefore that I am desirous to reserve unto my self, upon this occasion, is, that I have had the fortune to fall into the same reflexions, as many *Ingenious* persons have done before me, without consulting any of them.

FINIS



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OF THE MORE
Material REMARKS
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